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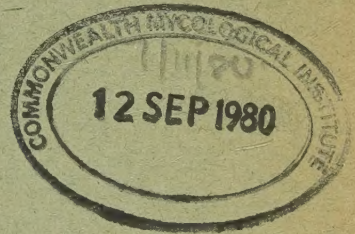
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MAURITIUS

Annual Report
OF THE
Ministry of Agriculture
AND
Natural Resources and
the Environment
for the year 1977

No. 13 of 1979



PRINTED AND PUBLISHED BY
L. CARL ACHILLE, GOVERNMENT PRINTER,
PORT LOUIS, MAURITIUS
MAY 1979

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MINISTRY OF AGRICULTURE AND NATURAL RESOURCES
AND THE ENVIRONMENT

Agricultural Services,
Redit,
5th June, 1978.

SIR,

I have the honour to submit the Annual Report of the Agricultural Services for the year 1977.

I have the honour to be,

Sir,

Your obedient Servant,

B. D. ROY,
Chief Agriculture Officer.

THE HONOURABLE THE MINISTER OF AGRICULTURE
AND NATURAL RESOURCES AND THE ENVIRONMENT,
MINISTRY OF AGRICULTURE AND NATURAL RESOURCES
AND THE ENVIRONMENT,
PORT LOUIS.

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Annual Report of the Ministry of Agriculture and Natural Resources (Agricultural Services) for the year 1977

I. Introduction

1.1 In virtue of an order made by the Minister of Agriculture and Natural Resources on the 31st January, 1972, the Permanent Secretary becomes the Chief Adviser to the Minister and the Chief Administrative Officer to the Ministry.

1.2 The Chief Agricultural Officer advises the Permanent Secretary on matters referred to him—policy, administrative and technical. He is responsible for the planning, coordination and execution of the work of the different divisions of the technical services of the Ministry, which, except for the Forestry Service, are grouped in the Agricultural Services. He is assisted by three Principal Agricultural Officers. Principal Agricultural Officer (Crops), Mr. K. Lutchmeenaraidoo, was responsible for the coordination and implementation of the approved programme of work of divisions involved with crop production, viz. Agricultural Division, Crop Experiment Stations, Plant Pathology, Entomology and General Chemistry; Principal Agricultural Officer (Livestock), Mr. R. Brunet, was responsible for the coordination and implementation of the programme of work of the Animal Production Division, Livestock Breeding Stations, Animal Health Division, Dairy Chemistry Division and Rodrigues Division; and Principal Agricultural Officer (Development), Mr. T. M. Narain, was responsible for the coordination and implementation of the programme of work of the Extension Services Division, Land Use Division, Projects Division, Environment, Engineering Division and Field Services Division. Towards the end of the year, it was agreed that Environment would be dealt with and would be merged into the Land Use Division to be restyled "Land Use and Environment Division", being given that Land Use is an environment problem. The Cane Planters and Millers Arbitration and Control Board falls technically under the responsibility of the Chief Agricultural Officer.

1.3 The Chief Agricultural Officer and the Principal Agricultural Officers also serve on a number of Boards and Committees either as Chairman or as members. These Boards and Committees are listed at Chapter II. They fall under the responsibility of the Ministry of Agriculture and Natural Resources and the Environment. They submit their own Annual Reports. This report deals with the work carried out by the professional, scientific and technical officers in the Agricultural Services.

1.4 Research on rice has been progressing satisfactorily, conducted mainly at Belle Vue Farm by the Chinese Agricultural Team and at FUEL with the assistance of the Sugar Estate. It is found possible to raise three crops of rice in a year under flooded conditions with average yields of 3, 2.5 and 3.5 tons respectively for the three crops—a total of 9 tons of air dry paddy per acre—given the right soil and temperature conditions and adequate irrigation water throughout the year. Experiments continue in the screening of suitable varieties for each season. At such a level of production, rice seems capable of yielding an economic return at least comparable to that of sugarcane. But it takes a few years to create the proper soil conditions in newly developed paddies to obtain such high yields.

1.5 Yet despite such promising results, the local production of paddy rice is going down annually. From 1974 to 1977, they were: 1032, 744, 698 and 413 tons respectively. An important constraint to production seems to be the reluctance of our farm workers to work in the mud of our paddy fields, necessary at transplanting, weeding and harvesting. One solution resides in the mechanisation of these operations. This aspect is being looked into. Puddling of paddies has been successfully carried out with a rotary hoe mounted on a Ferguson tractor both suitably designed to work in wet conditions.

1.6 Growing rice with overhead irrigation is an alternative to paddies as it will also take away much of the unpleasantness of wading in the mud and is also receiving attention. Preliminary results indicate that yields can be significantly lower. This is not so surprising considering that international rice research centres are selecting varieties mainly for flooded conditions and that upland varieties are most probably selected for drought resistance rather than for performance under overhead irrigation.

1.7 Rice research was continued and was mainly carried out at Belle Vue Rice Research Station by the Technicians from the People's Republic of China. In collaboration with FUEL Sugar Estate, rice experiments were also conducted at La Queen. With the right combination of rice varieties, it is entirely possible to raise three crops of rice per annum under flooded conditions giving a total of 9 tons of sun dry paddy per arpent. New promising rice varieties are gradually replacing the traditional TN1 variety in the production fields at Belle Vue Station. Experiment with objective to control the white rice stem borer was also set up and results showed that the systemic insecticide 'furadan' was highly promising. Attempt had been done to use rotovator mounted on tractor to prepare paddy fields. Preliminary results obtained were highly satisfactory. Further research will be conducted in this line so as to have the operation of land preparation fully mechanised. Research on rice cultivation both in virgin and ratoon sugarcane interlines was continued. The sun dry paddy yield was around 700 kg per arpent mixed stand.

1.8 Observation on control of greening disease on citrus was continued at Belle Vue Station. The scions were dipped in tetracyclin solution prior to budding. These citrus trees transplanted in December 1975 were growing very satisfactorily, with the exception of the Jaffa orange trees. The healthy citrus trees started to bear fruits this year and in large number.

1.9 Observation was continued on the performance of both sponge gourd and bitter gourd in their adaptation to the local agro-climatic conditions. Their yield performances on trellis were excellent and seeds have been collected for their propagation.

1.10 An open day was organised at the Belle Vue Farm at the time of the rice harvest in November and a very large number of farmers and members of the general public visited the farm.

1.11 Mr. N. K. Ganesh joined the Entomology Division late in 1975 as Sericulture Expert under Indian Technical Assistance to continue the work by his predecessor, the late Mr. Ramamurthy. A special section has been created within the Entomology Division with Scientific Officer Mr. Joomaye as counterpart to Mr. Ganesh to go fully into the possibilities of rearing silkworms on mulberries for the production of raw silk and its conversion to silk fabrics as a cottage industry or even larger industrial units as this enterprise builds up in strength.

1.12 To encourage its expansion, government, since the middle of 1976, guarantees to any farmer wishing to produce cocoons a purchase price of Rs. 20 per kilo of cocoon, free supply of mulberry cuttings for establishing mulberry plantations, silkworm larvae reared to the third larval stage and rearing equipments on loan. Yields of 600 kg cocoons per acre per year are easily achieved in areas where the rainfall is adequate for mulberry. There are no contagious diseases of silkworms in the country.

1.13 Extension work was intensified through television and radio talks. Several afternoon meetings were organised at social centres and youth clubs. A new reeling unit comprising of 8 reeling basins and one re-reeling machine was installed at Curepipe Experiment Station in November 1977.

1.14 Foliar diagnosis as a technique for assessing the fertilizer requirements of the tea bush in individual fields is more accurate and thereby can lead to substantial savings in the amounts of fertilizers applied and concurrently a higher yield of tea leaves compared to the usual fertilizer trials which can only lead to general fertilizer recommendations irrespective of soil type, rainfall and age of the bush. The World Bank which is financing the Tea Development Project has donated the necessary equipments—viz. the Atomic Absorption Spectrophotometer, the Chemical Processing Unit, the Flame Photometer and the visible spectrophotometer. However it takes many years of patient research to establish sampling and analytical methods and the basic data for the interpretation of the results.

1.15 A new chemistry laboratory has been built and completed at the end of the year. The British High Commission in Mauritius kindly arranged with the Tropical Products Institute in London to make available the services of Mr. A. B. Wood of Tropical Products Institute's pesticide analysis section for commissioning the laboratory and training the staff in the analysis of pesticide residues using gas chromatographic techniques. Mr. Wood spent six weeks in Mauritius. The Pesticide Laboratory evaluates the different pesticides offered on the market for the control of agricultural pests and diseases,

the level of pesticide residues of various kinds present at consumers' level in vegetables and other food products with a view to making recommendations on their safe use to the Pesticide Control Board of the Ministry of Health, of which the Divisional Scientific Officer (Chemistry) and other officers of the Ministry are members, for the framing of appropriate legislation for the protection of the farmer, the consumer and the environment.

1.16 Research work on the use of sugarcane and its by-products as animal feed continued in the Animal Production Division under the supervision of Dr. T. R. Preston who is an FAO Consultant in Tropical Animal Production to the Ministry. He also helped in devising farm buildings for intensive production of milk and meat.

1.17 The plane load of 270 heifers received in 1976 from the FAO/UNDP agency under the Milk and Meat Project were housed at Richelieu Livestock Breeding Station. They were subsequently inseminated with semen from four different breeds (Simmental, Sahiwal, Friesian and Creole). As soon as they would calve, they would be transferred to the milk/beef feedlots which are being constructed at Palmar and Richelieu Livestock Breeding Stations.

1.18 Each milk/beef feedlot will have two wings and each wing will be able to house 160 cows and 160 calves. They will be complete with milk parlour for machine milking, bull pens, calving pens, milk room, mechanical effluent disposal system, molasses tank, cane chippers and trench silos for ensiling chipped sugarcane. One wing of the milk/beef feedlot each at Palmar and Richelieu Livestock Breeding Stations is nearing completion and it is expected that they will be in operation early next year.

1.19 Production of methane (biogas) from the effluent is also being looked into and preliminary observations showed that 50 litres of gas can be produced from one kilo effluent dry matter. Biogas can be used as a source of fuel for tractors and for lighting purposes.

1.20 The British Council offered in October 1976 to donate to the Ministry of Agriculture books covering every field of agricultural science to a value of £1000. Early this year the books started arriving and towards the end of the year 144 books valued at over Rs. 15,000 had been received out of a list drawn up by us of 159 books. This gift came at a most opportune moment when many new members have joined the service and our own library is poor in books, qualified personnel and financial means for replenishment. It may be mentioned that the Ministry staff have free access to the library of the University of Mauritius and consequently every effort is made to avoid duplication with the University library in the order of our books.

1.21 The British Council must also be thanked for arranging the visit of an Environment Specialist, Dr. Kenneth Mellanby, to assess the problems of our environment and advise on an appropriate organisation within the Ministry for its improvement and control. Dr. K. Mellanby is a distinguished scientist who has published articles and books on pollution and the environment. He stayed in Mauritius from 29th August to 7th September and visited

sites and had discussions with representatives of Ministries and other people concerned with our environment problems. The degradation in the quality of our environment is a cause for concern in a country with limited land mass and expanding population. The encroachment on our agricultural lands by urbanisation and industry, the pressure on our scarce water resources for irrigation, domestic consumption and industry pose some serious problems.

1.22 At the request of the Minister for Rodrigues, the Chief Agricultural Officer visited the island early in the year. He was accompanied by Principal Agricultural Officer (Livestock), Mr. Brunet, responsible for the Agricultural Division in Rodrigues, and Divisional Scientific Officer (Land Use), Mr. Oogarah, who assists the Principal Agricultural Officer to service Rodrigues as regards supplies and coordination with specialist divisions for technical and professional support needed. The object of the visit was to inspect and review the development programme of past years and establish the programme for the current year. The Agricultural Division in Rodrigues has been responsible for practically all development projects of the island. There is need for it to concentrate more on agricultural development and gradually relinquish responsibilities for other areas of development to the Ministries concerned under the supervision and coordination of the Ministry for Rodrigues.

1.23 The development objectives are:

- (i) To provide and, in certain cases, to improve the water supply to farmers of the valley and in most cases of other valleys as well, including Port Mathurin, to meet domestic, livestock and irrigation needs;
- (ii) To improve water catchment and stream flow in the valley;
- (iii) To stabilise the slopes of the valley in as permanent a manner as is reasonably feasible;
- (iv) To achieve a quick increase in agricultural production;
- (v) To demonstrate rational and efficient land use.

1.24 To achieve these objectives the development works in progress are:

- (i) Reafforestation of the steeper and upper slopes to protect the soil and ensure a stream flow in the valley;
- (ii) Building of stone walls around reafforested areas for protection against grazing by stray animals until the plants are well established;
- (iii) Building small walls across the gullies to control erosion and water flow;
- (iv) Terracing the steeper slopes for cropping with minimum erosion risks;
- (v) Resettling of lessees from erosion susceptible slopes to lower slopes;
- (iv) Establishing and maintaining pastures on lands not otherwise suitable for crop production;
- (vii) Building dams to impound water;

- (viii) Building offstream reservoirs to avoid destruction by floods;
- (ix) Building storage reservoirs on the crests of hills for distribution by gravity to the valleys around;
- (x) Installation of pumps for pumping water from dams in the valleys to storage reservoirs on the hills;
- (xi) Installation of pipes for water reticulation to farmers around;
- (xii) Establishing demonstration gardens for vegetable production and for showing cultural practices.

1.25 Research and Extension also need to be started. It is hoped that it will be possible to recruit appropriate staff for the purpose. Housing facilities may be made available in the course of the coming year.

1.26 The Chief Agricultural Officer and two other members of the Agalega Corporation, Messrs. B. M. Padya, Director of Meteorological Services, and S. Laloo, Chief Accountant of the Ministry of Finance, visited Agalega at the request of the Corporation to report on all aspects of development in the island, social, economic and infrastructure. The climate is healthy and very suitable for coconut plantations which will remain the mainstay of the economy until more people may be induced to settle there when the economy can be diversified. With adequate labour, the yield of copra can be considerably increased, through proper maintenance of the plantations, including timely weed control and fertilisation. The variety "Gueule Rose" found in Agalega is in great demand in Mauritius as a drinking nut, although a tall variety, and efforts are being made for their seeds to be brought for sale from our nurseries as seedlings. It is proposed to introduce the Rennel variety from the Salomon Islands for crossing with Malayan Dwarfs. Hybrids of such a cross can yield one ton of copra or more per acre.

1.27 Some important staff changes took place in the course of the year. Divisional Scientific Officer (Animal Husbandry), Mr. Delaitre, was on pre-retirement leave as from the end of November. He had acted as Principal Agricultural Officer for some time. He has had a long career in government, all the time in Animal Production, and consequently his retirement has created a serious vacuum in the Animal Production Division, which fortunately is staffed with some well qualified officers, who though young are hardworking and enthusiastic. A similar situation arose last year when the Divisional Scientific Officer (Chemistry), Mr. S. Belcourt, and the Divisional Scientific Officer (Dairy Chemistry), Mr. J. Pablot, retired after about 30 to 35 years' service leaving their respective divisions staffed at the head with relatively young recruits, of whom the second left for the United States on a three-year training course in Dairy Science and Technology. Two other very experienced senior officers, namely Agricultural Superintendents Messrs. R. Pascal and A. Ferrière retired at the end of 1976 and 1977, respectively. Divisional Scientific officer (Land Use) Mr. P. Oogarah has left the service to take up employment as General Manager of the Tobacco Board as from 12th August 1977. He had received special training at postgraduate level in certain aspects of land use. Scientific Officer (Agronomy) Mr. N. Govinden returned from a postgraduate training course in Canada and is acting as Divisional Scientific Officer (Land Use).

II. Boards and Committees

The Permanent Secretary or his representative served on the following Boards and Committees:

Agalega Corporation Board
Agricultural Marketing Board
Board of Agriculture, Natural Resources and the Environment
Board of Examiners for the Registration of Agricultural Chemists
Cane Planters and Millers Arbitration and Control Board
Cane Release Committee
Institute of Education Council
Irrigation Committee
Land Settlement Committee
Mauritius Meat Authority
Mauritius Sugar Industry Research Institute Executive Board
Mauritius Sugar Industry Research Institute Advisory Board
Pesticides Control Board
Rose Belle Sugar Estate Board
Sugar Industry Development Fund Committee
Sugar Insurance Fund Committee
Sugar Millers Development Fund Committee
Sugar Planters Development Fund Committee
Sugar Planters Mechanical Pool Corporation Board
Tea Board
Tea Development Authority
Tobacco Board
University of Mauritius, Senate
University of Mauritius, Council

III. Board of Agriculture, Natural Resources and the Environment

3.1 The Board functions under Act No. 2 of 1977. It advises the Minister on all matters of general policy relating to agriculture, forestry and the utilization and preservation of natural resources and the environment.

3.2 The following Advisory Committees were set up for specific purposes and function under the aegis of the Board:

- (a) The Land Settlement Committee
- (b) The Cane Release Committee
- (c) The Man and Biosphere Advisory Committee.

3.3 The Board met in October. Recommendations were made for the composition of the Cane Release Committee and the Land Settlement Committee. The Board approved of the Man and Biosphere Advisory Committee falling under the aegis of the Board. An Ad Hoc Committee was set up to look into priorities for future training in the field of agriculture.

3.4 The Land Settlement Committee met once during the year. It dealt mainly with the transfer of holdings. Of the 30 cases considered, two were rejected. Renewal of lease agreements was also discussed.

3.5 The Cane Release Committee met once during 1977 to review the performance of cane varieties that have reached the final stages of testing. Of the 10 varieties planted in M5 nurseries, 3 were rejected, 2 were recommended for release, and the decision on the other 5 was postponed until more information becomes available in the next few years. The two varieties recommended for release are M1227/62 and M376/64. The first variety is very rich, has no serious disease problems but is highly susceptible to wind damage. The second variety is a high yielder, is adapted to many soil types, has good disease resistance but has a rather low sucrose content.

3.6 The Man and Biosphere Advisory Committee was set up to advise the Ministry on action to be taken for the protection and conservation of the environment. The Committee met six times during the year. It discussed several environmental problems including legislation on the limitation of noise and environmental education.

IV. Comité de Collaboration Agricole Maurice-Réunion-Madagascar

4.1 The twenty-fifth conference of the Committee was held in Réunion from the 4th to the 11th November 1977. Representatives only from Mauritius and Réunion attended the meeting. Various papers were presented followed by discussions. Among topics discussed were the use of Polaris as a cane ripener in Mauritius and Réunion, the irrigation project of the Bras de la Plaine, forecasting the imminence of blight attack on potatoes, the 'pou à poche blanche' (*Pulvinaria Iceryi*) on sugarcane. The Acting Divisional Scientific Officer (Plant Pathology) of the Ministry attended a special meeting in connection with the phytosanitary control of the dreadful Fiji disease of sugarcane. Fields visits included the SICAMA—a farmer cooperative involved with grading, packing and marketing of vegetables, CILAM—a cooperative dairy and pasteurisation plant—and the feedlot of Sucrerie de Bourbon. In the Course of the year there has been an exchange of scientists and technicians between the two countries and as in the past, similar exchange visits have been programmed for the following year.

4.2 The Chairman of the local committee is the Director of the Mauritius Sugar Industry Research Institute. The Ministry is represented in the Committee by the Chief Agricultural Officer. Officers of the Agricultural Services form part of the Mauritian scientists and technicians visiting Réunion with a larger share for the officers of the Mauritius Sugar Industry Research Institute and the private sector.

V. The Sugar Industry

CROP RESULTS

5.1 Apart from a delayed start in November and a shortfall in March, rainfall was adequate enough during this crop season for vegetative growth. Conditions for maturation were also favourable so that the sucrose content increased to a higher level than last year. However, many plantations were affected by the scale insect "*Pulvinaria iceryi*" more commonly known as the "Pou a Poche Blanche", especially in the southern, eastern and northern districts. The total output of sugar amounted to 665,435 metric tons.

5.2 Hereunder are some of the crop results compared with those of 1976:

		1977	1976
Area cultivated (arpents) (total)	...	206,500	206,488
Area reaped (arpents) (total)	...	191,276	191,617
Area reaped (arpents) (estates)	...	105,050	105,750
Cane produced (metric tons)	...	6,022,285	6,402,277
Sugar produced, metric tons 98.5° Pol	...	667,327	691,473
Commercial Sugar 98.7° Pol	...	665,435	689,932
Tons of cane per arpent (metric)	...	31.5	33.4
Tons of sugar per arpent (metric) @ 98.7° Pol	...	3.48	3.60
Yield of sugar per cent cane	...	11.05	10.78
Crushing rate, hourly, metric tons	...	109.0	111.2
Crushing rate, daily, metric tons	...	2,099	2,119

CANE VARIETIES

5.3 In order of importance, the main varieties making up the 1977 crop were the following on estate land: S17, M13/56, M377/56, M93/48. These varieties accounted for 85 per cent of the crop. The remaining 15 per cent were made up of M351/57, M31/45, M124/59, M438/59 and a few other varieties each grown to the extent of less than 1 per cent.

QUOTAS AND PRICES

5.4 The negotiated price during the period 1st July 1976 to 30th June 1977 under the Common Market Agreement for a quota of 636,425 long tons was for a total sum of Rs 1,553,780,000.

EXPORTS

5.5 The exports of sugar were as follows:

Destination		Long Tons	
		1977	1976
United Kingdom	...	528,782	493,671
U.S.A.	...	53,651	36,679
Canada	...	44,186	14,408
Eire	...	4,877	—
Italy	...	2,433	5,000
Seychelles	...	1,196	1,347
Comoro Islands	...	1,290	—
Republic of Niger	...	10	—
Yemen	...	—	9
TOTAL	...	636,425	551,114

Apart from the sugar exported, there were 37,500 long tons consumed locally.

MOLASSES AND ALCOHOL

5.6 The production of molasses for the crop amounted to 194,342 metric tons and the quantity exported during the calendar year was 194,660 metric tons. As in the previous years, molasses were used for the manufacture of rum and various alcoholic products. 550 tons of molasses were used for the preparation of cheap cowfeed at St. Antoine at the request of the Ministry of Agriculture. Médine Sugar Estate produced some 129,942 litres of vinegar and 937,571 litres of alcohol; Solitude produced 1,227,900 litres of alcohol and 20,120 litres of perfumes at 100° G.L. and St. Antoine 1,087,422 litres of alcohol. 880 kgs. of perfumes were exported.

VI. The Cane Planters & Millers Arbitration and Control Board

HEAD OF DIVISION: A. A. AUMEERALLY, GENERAL MANAGER

6.1 The Board operated under "The Cane Planters and Millers Arbitration and Control Board Act (No. 46) of 1973 and No. 26 of 1976". The executive machinery of the Board was run as a division of the Ministry of Agriculture and Natural Resources and the Environment.

MEETING OF THE BOARD

6.2 The Board held 12 meetings during the year as follows:

3 meetings in connection with the assessment of sugar to planters; 2 meetings in connection with protests against assessment; 3 meetings with regards to Separate Tests. Were also discussed separate tests on canes affected by "Pulvinaria Iceryi". 3 meetings were held on the reorganisation of the Board, 1 meeting in connection with road rate, protest against refund of transport of road rate, cost of loading, molasses, scums and fertilizer value of molasses.

During these meetings were also discussed: Working Hours of the Laboratories, Overtime, Shift System, Draft Estimates, Special Export Duty on Sugar, Contracts with Société Caboche & Cie. & Messrs Ducray Lenoir, Maintenance, Repairs and Servicing of all Equipment, Order of Spare Parts, New Building, transfer of canes, Mechanical Unit and Closing of Weighbridge.

CANE TESTING

6.3 The canes supplied by 768 planters or group of planters were tested separately. The total number of tests carried out was 215601 by use of core sampling equipment. All factories have been equipped with mobile or fixed core sampling machines before the start of the 1977 crop.

ASSESSMENT OF SUGAR

6.4 Following the publication of the final assessment of sugar for the 1976 crop two cooperative credit societies and one planter lodged protests against the awards made by the Board. At the subsequent hearing by the Board one C.C.S. withdrew its protest. As for the other C.C.S. the Board maintained its previous assessment. Regarding the protest of the planter the assessment of sugar was revised.

TRANSPORT COSTS

6.5 The final assessment of Road Rates for the 1976 crop was issued in early May 1977. The approved rates were as follows:—

- (i) Millers were entitled to claim Rs 3.39 for the first ton mile and 50 cents for each additional ton mile in respect of canes transported from outlying weighbridges to factories. The maximum mileage claimable was 4 miles.
- (ii) Planters who had themselves caused their cane to be delivered to factories were entitled to a refund of 50 cents per ton mile for each mile over and above a distance of 4 miles.

DELIMITATION OF FACTORY AREAS

6.6 No application for change of factory area was received by the Board.

PERMITS TO MIDDLEMEN

6.7 Twenty permits were renewed and one new application was granted.

CANE CONTRACTS

6.8. There were 9,916 cane contracts registered by the Board, covering some 35,500 planters. The number of planters who failed to enter into contract before the 31st May totalled 606 compared with 807 in 1976.

CANE VARIETIES

6.9. During 1977 the varieties approved for planting were the same as for the 1976 crop, according to Proclamation No. 3 of 1975, namely:—

M 134/32 (red, white and striped)	M 351/57
M 31/45	M 124/59
M 202/46	M 438/59
M 93/48	M 377/56
M 99/48	E 1/37
M 253/48	E 50/47
M 442/51	B 37172
M 409/51	B 37161
M 13/53	B 51129
M 356/53	N. Co. 376
M 13/56	S. 17

CONTROL OF WEIGHBRIDGES

6.10. The number of weighbridges in operation was 74. All the weighbridges were tested for accuracy prior to the beginning of the crop. All were found correct on first examination. All weighbridges were again tested for accuracy on seven occasions during the crop. All weighbridges weighing more than 5,000 tons of canes during 1976 crop are automatic with visual indicators, recording and printing devices.

SURPRISE CHECKS CARRIED OUT AT WEIGHBRIDGES DURING THE CROP

6.11. During the crop, 287 surprise checks were carried out and 271 vehicles were reweighed (252 lorries and 19 carts).

VII. Agricultural Division

HEAD OF DIVISION: DR. A. L. OWADALLY, DIVISIONAL SCIENTIFIC OFFICER (AGRONOMY)

Scientific Officer: L. LI KWAN PUN

7.1. Rice (*Oryza sativa*)

7.1.1. Variety trial

Two variety trials were conducted at Queen Victoria, Flacq. The first trial was performed during January—May and the second one during July—December. In both trials a randomised block layout was used with four replicates. Varieties compared were Kwang Loo i No. 4, Red Plum Zao, Chen Chu i No. 11, Nanking No. 11 and TN1 as control.

7.1.2. Results

TABLE 7.1
MEAN PADDY YIELDS IN METRIC TONS Ha⁻¹

Variety	1st trial	2nd trial
Chen Chu i No. 11	7.57	9.62
Nanking No. 11	7.33	10.47
Red Plum Zao	6.58	6.35
TN1 (control)	6.41	9.89
Kwang Loo i No. 4	5.67	5.11
L.S.D. 5%±	0.86	3.05
L.S.D. 1%±	1.21	4.28

In the first trial, Chen Chu i No. 11 was the best performer followed by Nanking No. 11. Their yield differences compared to Kwang Loo i No. 4 reached 1% significance level. There was no significant difference in yield between Chen Chu i No. 11 and Nanking No. 11.

7.1.3. In the second trial, Nanking No. 11 outyielded all the rest followed by TN1 and Chen Chu i No. 11. There was no significant difference in yields among these three varieties. As in the first trial, Kwang Loo i No. 4 gave the poorest yield. The yield differences of Kwang Loo i No. 4 compared to Nanking No. 11, TN1 and Chen Chu i No. 11 were highly significant.

7.1.4. Seasonal sowing observation

Three sowings were carried out at Queen Victoria, Flacq. One in mid January, one in late May and one in mid July. The following five rice varieties:—Kwang Loo i No. 4, Red Plum Zao, Chen Chu i No. 4, Nanking No. 11 and TN1 were under observations.

7.1.5. Results

TABLE 7.2
AVERAGE OF 6 HILLS

Sowing	Variety	Plant height cm.	Tillers per hill	Panicles per hill	Panicle length cm.	Total seeds per panicle	Full seeds per panicle	1000 grain weight gm.	Sowing to harvest days
Mid—January	Kwang Loo i No. 4	63.8	17.0	16.8	16.5	74.3	65.8	26.4	110
	Red Plum Zao	77.0	16.7	16.2	19.7	81.7	73.2	26.1	113
	Chen Chu i No. 11	80.2	14.3	14.2	21.2	102.3	86.3	24.3	121
	Nanking No. 11 ...	79.3	15.0	15.0	20.2	111.4	89.3	23.9	125
	TNI ...	87.3	16.5	16.3	22.0	76.2	67.4	24.2	132
Late — May	Kwang Loo i No. 4	47.3	30.2	29.2	12.3	51.7	38.2	21.9	163
	Red Plum Zao ...	55.3	27.7	26.3	13.6	62.1	46.3	22.1	166
	Chen Chu i No. 11	66.1	20.2	19.8	17.4	74.3	55.4	20.7	171
	Nanking No. 11 ...	57.5	11.7	11.7	15.7	73.9	54.3	21.8	174
	TNI ...	59.5	17.2	14.5	17.2	67.3	49.6	22.5	180
Mid — July	Kwang Loo i No. 4	52.3	16.0	14.7	17.3	99.3	88.0	24.7	143
	Red Plum Zao ...	54.3	20.8	20.0	17.5	66.3	61.0	27.6	149
	Chen Chu i No. 11	64.2	17.2	16.3	18.5	103.3	100.7	23.7	156
	Nanking No. 11 ...	58.5	14.3	13.8	18.0	129.3	122.7	26.5	158
	TNI ...	62.0	19.5	19.5	17.2	84.3	78.3	23.4	163

The crop cycle of each variety in the late May trial was longer than the corresponding other two. Also the panicle lengths were shorter, number of full seeds fewer and thousand grain weight lower.

7.2. Mushroom *Volvariella voluacea*

7.2.1. Two trials were attempted at Richelieu Experimental Station. In the first trial, 230 kg of dry rice straw were used for the production of mushroom. A total of 22.65 kg of fresh straw mushroom were collected.

7.2.2 The second trial was carried out inside a converted tobacco barn. 30.90 kg of a fresh marketable straw mushroom were collected from 325 kg of spawned rice straws. The duration of each trial was approximately two months.

7.2.3. The method adopted in the straw mushroom production was as follows:

7.2.3.1. Sterilisation and Soil bed preparation

Loose and fertile soil was brought inside the production shed in sufficient quantity. A mixture of 0.1% formalin and 0.1% DDVP (Dichlorvos solution) was sprayed to sterilise the site and to exterminate earth worms and insects living in the soil. Soil beds were then made with a symmetrical trapezoid cross-section. The base was 1m and the upper side 0.7 m. The height of the soil bed was 15 cm and its length was variable, 2 to 3 metres depending upon the length of the production shed. A distance of 30 — 40 cm was allowed between two adjacent beds.

7.2.3.2. *Straw bundle preparation*

Rice straws were tied up into bundles weighing about 0.5 kg each. They were immersed in water till thoroughly soaked. They were then removed and stacked overnight and covered with a polythene sheet.

7.2.3.3. *Stacking and inoculation*

The tops of the soaked straw bundles were folded up so that their length was about 70 cm long. The straw bundles were then placed closely and neatly on the soil bed with all the folded ends along the same side to form the first layer. The straw layer was moistened with adequate water and then inoculated. The spawn was placed on the top surface of the straw layer at 5 cm from the edge. The inoculated band was about 3 cm wide. A next layer of straw bundle was then placed with the folded ends on the opposite edge. This layer was moistened and inoculated as for the first layer. The procedure was repeated until the piles reached 80 — 120 cm high. The entire top surface of the final layer was inoculated and then covered with a 3 cm thick layer of wet straw. The straw was tightly pressed together during stacking. About 3 bottles of spawn each of 500 ml was needed to inoculate 100 kg of dry rice straw.

7.2.3.4. *Humidity and temperature requirements*

Moisture content of the straw heap should be maintained at 70—85%, while the relative humidity within the shed at 85 — 95%. Water was sprinkled on to the exposed heap surfaces twice a day so as to keep them moist.

7.2.3.5. The temperature of the heaps would rise gradually and reach a peak of 55—63°C by the fifth day after stacking. If the temperature of the heap failed to rise above 50°C, there might be too much water present in the heap in which case less water should be sprinkled daily or the heap might not have been pressed tightly enough. In the latter event, the heap should be well pressed again.

7.2.3.6. *Mushroom collection*

About 10—12 days after inoculation, pin heads would appear followed by egg shape mushrooms in about 5 days later on the exposed surfaces or the straw heaps and the soil beds. After collecting the first batch of mushrooms, water should be sprinkled on to the heap and then pressed. The second batch of mushrooms would be ready for collection in about 7 days later. There would be four periods of collection. The duration of cropping period would last about 35 days.

About 10 kg of fresh mushrooms may be collected for every 100 kg of dry straw stacked.

SCIENTIFIC OFFICER: G. PALLANY

7.3. Tobacco (*Nicotiana tabacum* L.)

7.3.1. Variety trials

A variety trial comprising of nine (9) flue-cured varieties namely N.C. 95, S.C. 66, S.C. 71, S.C. 72, Coker 347, Speight G 28, Speight G 33, SCR and Yellow Mammoth was conducted in the first season of 1977 at Richelieu Experiment Station and repeated in the second season on the same station. Results obtained for the first season crop showed that all varieties outyielded ($P = 0.05$) Yellow Mammoth (12,484 kg/ha). The highest green leaf yield was achieved with the commercially grown variety N.C. 95 (20,460 kg/ha) but no significant difference was noted between that yield and those achieved by the other new introductions. The same trend was noticeable with cured leaf data: the highest yielder being N.C. 95 (2316 kg/ha) and the lowest Yellow Mammoth (1.325 kg/ha). The yield of N.C. 95 was significantly higher than the others. The tallest plants were obtained with S.C. 66 (141 cm) and the shortest plants were those of Speight G 28 (102.6 cm). Statistical analysis shows that the heights of plants of S.C. 66 differ significantly ($P = 0.05$) from those of the others except SCR and Yellow Mammoth. A nematode assessment carried out by the Plant Pathology Division confirmed the high resistance potential of N.C. 95. However its degree of infestation does not differ significantly from that of Coker 347, Speight G 28, S.C. 66, S.C. 72, and S.C. 71. The more susceptible variety was SCR but no significant difference was noted between its degree of infestation and that of Speight G 33.

7.3.2. Nitrogen fertilizer trial

This experiment was tried again for both seasons of 1977 at Richelieu Experiment Station. The highest yield of green leaf was achieved with treatment N_2 (30 kg N/ha) with a yield of 23,679 kg/ha. As expected, the lowest yield was obtained with treatment N_1 (0 kg N/ha) with a yield of 19,149 kg/ha. No nitrogen (N_0) and high doses of nitrogen (N_4) seem to have a significantly depressing effect ($P = 0.05$) on the green leaf yield. Treatment N_3 (45 kg N/ha) gave the highest yield of cured leaf (3,042 kg/ha). Treatment N_0 produced 1,991 kg/ha of cured leaf only. All the treatments gave significantly higher yields of cured leaf than the control. The second season crop is still in progress.

7.3.3. Potash fertilizer trial

This trial was started in the first season of 1977 and repeated in the second season at Richelieu Experiment Station. Differences in yields achieved by all treatments including the control were not very marked in the first season. Although P_1 (240 kg K₂O/ha) gave the highest green leaf yield (15,249 kg/ha), differences between yields of all treatments were not significant ($P = 0.05$). Likewise the treatments do not have any significant boosting effect ($P = 0.05$) on the cured leaf yield although K_3 (180 kg K₂O/ha) gave the highest yield (1,958 kg/ha).

The second season crop is still in progress.

7.3.4. Planting date experiment

The experiment was conducted in both seasons of 1977. The objective was to determine the optimum date of planting of tobacco for both seasons. In the first season, the treatments were as follows:

- P₁ Transplanting mid February
- P₂ Transplanting at the beginning of March
- P₃ Transplanting mid March
- P₄ Transplanting at the beginning of April
- P₅ Transplanting mid April

The first treatment P₁ could not be planted in time as the field was not then ready. The P₂ treatment received twice as much replications as the others.

The experiment for the second season of 1977 is still in progress,

Results for the first season are presented below (Table 7.3.)

TABLE 7.3

YIELD OF FRESH AND CURED LEAVES AND PLANT HEIGHT (cm.)

Treatment				Mean Fresh Yield kg/ha	Mean cured yield kg/ha	Plant height (cm)
P ₂	...	...	...	17,159	2,107	110
P ₃	...	...	...	14,292	2,027	99.8
P ₄	...	...	...	14,238	1,793	111.9
P ₅	...	...	...	9,640	1,224	96.8
S.E of P ₂ mean	...	...	...	1,414	190.3	4.2
S.E. of other means	...	...	...	2,000	269	5.97
L.S.D. P ₂ v/s P ₃ or P ₄ or P ₅	...	...	...	5,336	485.5	15.9
L.S.D. for other paired comparisons	...	...	...	6,162	718.2	18.4

Mid April planting shows a significantly depressing effect on the yield of fresh and cured leaves. Further there are indications of a gradual reduction in fresh and cured yield owing to delay planting after early March. No significant difference was noted for effect of time of planting on plant height.

7.3.5. Chemical control of suckers experiment

The experiment which started in 1976 was repeated in both seasons of 1977. Results for the first season crop did not show any significant difference at the 5% level in the green leaf yields of all treatments including the control hand suckering (15,677 kg/ha). The highest fresh leaf yield was achieved with plots treated with contact chemical off-shoot T—85 followed by systemic chemical Royal M.H. (18,815 kg/ha) while the highest cured leaf yield was obtained with systemic chemical M.H. 30 alone (3,163 kg/ha). Plots treated with contact chemical off-shoot T—85 alone and those treated with contact chemical off-shoot T—85 followed by systemic chemical Royal M.H. did not give significantly higher yields of cured leaves 3,163 kg/ha and 2,852 kg/ha respectively than the highest yielder.

7.3.6. Analysis of cured leaves to determine residual effect of chemicals was not carried out.

7.3.7. The second season crop is in progress at Richelieu Experiment Station.

7.3.8. *Demonstration on planter's land*

The demonstration was carried out in the first season of 1977 and repeated in the second season on Mr. O. Ramdenée's farm at Trou-aux-Biches. The objectives were to compare results achieved from a crop planted following cultural practices as recommended by the Agricultural Division and a second crop grown according to the farmer's usual method of planting.

7.3.9. Results and data have been recorded and are summarized below (Table 7.4.)

TABLE 7.4
COMPARATIVE YIELD PERFORMANCES

				<i>Scientific officer Agricultural Division</i>	<i>Farmer Mr O. Ramdenée</i>
Plot size	...	...	...	1 Arpent	1 Arpent
Seed rate	...	...	...	1 g/100 ft ²	5 g/100ft ²
No. of seedlings on bed	...	...	...	10,000	9,000
Green leaf yield per arp.	...	...	...	6,850 kg	5,430 kg
Cured leaf yield per arp.	...	...	...	650 kg	550 kg
Farm yard manure	...	...	...	NIL	1 Ton

SCIENTIFIC OFFICER: J. M. HEERASING

7.4. *Cucumber (Cucumis sativus L.)*

7.4.1. An observational trial was conducted at Curepipe Experiment Station from November 1976 to February 1977 to compare the yield potentials of two American varieties viz Poinsett and Palomar with that of the local variety. The results of the trial are shown in table 7.5 below.

TABLE 7.5
YIELD OF THREE CUCUMBER VARIETIES (CUREPIPE
EXPERIMENT STATION, 76/77)

<i>Variety</i>	<i>Yield per Hectare</i>				
	<i>Total No. of fruits</i>	<i>Total No. of market- able fruits</i>	<i>% Market- able fruits</i>	<i>Total fruits weight (tonnes)</i>	<i>Total Mar- ketable fruits wt. (tonnes)</i>
Poinsett	... 130,046	109,054	84.0	42.2	36.5
Palomar	... 79,103	66,815	84.5	28.2	24.8
Local ...	... 35,327	27,135	76.8	18.8	14.9

The results indicate the superiority of the American varieties over the local one both in terms of total and marketable fruit yield. The best yielder variety Poinsett produced nearly twice as many fruits as the other American

variety Palomar. Its yield of 130,046 fruits ha⁻¹ nearly quadrupled that of the local variety (35,327 fruits ha⁻¹). These proportions were not observed in either the total fruit weight or the total marketable fruit weight as the fruits of the American varieties which were of the same and fairly uniform size were smaller than the local type. It was observed that the local variety was more susceptible to pest attack and this could account for its lower % of marketable fruits (76.8%) on comparison with the American varieties (84.25%). The same trial is being repeated at Curepipe Experiment Station in November 77.

7.5. Garlic (*Allium sativum* L.)

7.5.1. (a) Fertilizer trial

A trial was planted in a randomized block design with five replicates at Plaisance Experiment Station to determine the optimum level of nitrogen application to maximize the yield of bulbs of garlic variety Rodrigues. The treatments were 4 levels of nitrogen viz:—

- (i) 25 kg N ha⁻¹ (N₁)
- (ii) 50 kg N ha⁻¹ (N₂)
- (iii) 75 kg N ha⁻¹ (N₃)
- (iv) 100 kg N ha⁻¹ (N₄)

7.5.2. (b) Planting Date trial

A trial was conducted in a randomized block design with four replicates at Central Experiment Station to determine the optimum time of planting of garlic variety Feng Shan Selection No. 1. The planting periods chosen were Mid-April, End-April, Mid-May, End-May and Mid-June. The results are shown in table 7.6.

TABLE 7.6
YIELD AND BULB SIZE OF GARLIC
(Central Experiment Station, 77)

Treatment			Mean yield	Bulb size
			kg ha ⁻¹ bed	(% grade B)*
Mid — April	...	...	9791.50	69.25
End — April	...	...	8633.00	59.50
Mid — May	...	...	9400.75	71.50
End — May	...	...	7291.75	57.50
Mid — June	...	...	5364.50	45.25
S.E. of a mean ±	...	...	578.3	4.78
L.S.D. (5%) ±	...	...	1781.8	14.73

The results indicate a highly significant linear decrease in yield from Mid-April to Mid-June. The loss is estimated at about 510 kg ha⁻¹ bed per week lateness. The data suggest that planting earlier than Mid-April could lead to better yields. The size of the bulbs as measured on a weight basis by the percentage of grade B bulbs (diameter 2.5 to 5.0 cm) decreased significantly from Mid-April onwards. No grade A bulbs (diameter more than 5 cm) were produced.

* Bulb diameter 2.5 to 5.0 cm.

7.5.3. (c) *Spacing trial*

A trial was conducted in a randomized block design with 5 replicates at Plaisance Experiment Station to determine the optimum inter-row spacing in garlic cultivation. The variety was Rodrigues and the spacings adopted were:

(i) 7.5×7.5 cm (S_1)

(ii) 7.5×15.0 cm (S_2)

(iii) 7.5×22.5 cm (S_3)

and (iv) 7.5×30.0 cm (S_4)

The yield and quality of garlic are shown in table 7.7.

TABLE 7.7

YIELD AND BULB SIZE OF GARLIC

(Plaisance Experiment Station, 1977)

<i>Treatment</i>	<i>Mean yield —1 kg ha bed</i>	<i>Bulb size (% grade B)*</i>	<i>Confidence intervals for Bulb size (5%)</i>
7.5×7.5 cm (S_1)	... 8399.3	10.44	(6.3, 15.6)
7.5×15.0 cm (S_2)	... 9648.2	52.70	(45.1, 60.3)
7.5×22.5 cm (S_3)	... 8685.3	75.83	(69.0, 82.0)
7.5×30.0 cm (S_4)	... 8246.7	81.50	(75.2, 87.0)
SE of a mean $\pm$	... 605.5		
LSD (5%) $\pm$	... 1865.7		

No significant difference was observed in yield among the treatments. The total yield appears to be at a maximum at an inter-row spacing of 15 cm, and this corresponds to the local recommended practice. Highly significant differences were observed in the quality of the produce as measured by the % of grade B bulbs (diameter 2.5 to 5.0 cm) among the treatments. The quality improved with decreasing plant density and it was further observed that the improvement between successive plant densities took place at a decreasing rate as one moved from the highest to the lowest density. No grade A bulbs (diameter > 5 cm) were produced.

7.5.4. (d) *Variety trial*

A trial was conducted in a randomized block design with five replicates at Central Experiment Station to assess the yield potentials and bulb quality of four varieties of garlic. The varieties were:

(i) Feng Shan Selection No. 1,

(ii) Feng Shan Selection No. 2,

(iii) Pooning,

and (iv) Rodrigues.

The yield and quality of garlic are presented in table 7.8

* Bulb diameter of grade B: 2.5 to 5.0 cm.

TABLE 7.8

YIELD AND BULB SIZE OF GARLIC
(Central Experiment Station, 1977)

Variety	Mean yield kg ha ⁻¹ bed	Bulb size (% grade B)*
Feng Shan Selection 1	... 8,208.2	54.2
Feng Shan Selection 2	... 7,937.4	60.6
Pooning	... 6,374.8	57.0
Rodrigues	... 9,729.0	58.2
SE of a mean ±	... 815.2	3.47

There was no significant varietal difference in yield but the data indicate the marginal superiority of variety Rodrigues over the other varieties. No significant varietal difference existed in the quality of the produce as measured by the % of grade B bulbs (bulb diameter 2.5 to 5.0 cm). Variety Feng Shan Selection No. 1 showed marginal superiority over the others. No grade A bulbs (diameter $\geq$ 5 cm) were produced.

7.6 Ginger (*Zingiber officinale* Roscoe)

7.6.1. A fertilizer trial was conducted in a randomized block design with four replicates at Plaisance Experiment Station to study the effects of a factorial combination of 3 levels of Phosphate and 3 levels of Potash on the yield of green rhizomes. The levels were 0 (P₀), 50 (P₁), and 100 (P₂) kg P₂O₅ ha⁻¹ for phosphate and 0 (K₀), 300 (K₁) and 450 (K₂) kg K₂O ha⁻¹ for potash.

7.6.2. Planting was done late in the season. The unavailability of water on the experimental site to correct for deficient rainfall was believed to have caused stunted growth in the early stages of the crop-cycle. As a result the yields of fresh rhizomes obtained were very low. Statistical analysis showed no significant difference among the treatments.

7.7. Onion (*Allium cepa* L.)

7.7.1. Three onion varieties were planted from sets in an observational trial at Plaisance Experiment Station to compare their yields and crop-cycle. Sets of the hybrid varieties Yellow Granex and California Red were produced in the preceding season (October — December 76) on the same station whereas sets of the standard Local Red variety were purchased from a Local onion grower.

The crop-cycles and yields of the three varieties are presented in table 7.9.

* Bulb diameter 2.5 to 5.0 cm.

TABLE 7.9

PERFORMANCE OF THREE ONION VARIETIES

(Plaisance Experiment Station, 1977)

<i>Variety</i>	<i>Crop-cycle (months)</i>	<i>Yield of bulbs m. tons ha-1 bed</i>
Yellow Granex ...	5	27.72
California Red ...	5	8.07
Local Red ...	4	22.07

The hybrid variety Yellow Granex was found to be the highest yielder (27.72 tons ha-1 bed). As in the preceding year variety California Red failed to bulb satisfactorily under the conditions prevailing at Plaisance Experimental Station. It gave a poor yield of 8.07 m. tons ha⁻¹ bed. The Local Red variety performed remarkably well (22.07 tons ha-1 bed) and had a crop-cycle of one month less than that of the hybrid varieties (crop-cycle 5 months).

7.8. *Squash (Cucurbita pepo)*

7.8.1. An observational trial was conducted in a randomized block design with 2 replicates at Pamplémousses Experiment Station to compare the yields of 4 varieties of squash. The varieties were Golden Zucchini, Fordhook Zucchini, Benning's Green Tint and Golden Squash (Local). The mean yields in terms of fruit number and fruit weight are shown in table 7.10.

TABLE 7.10

PERFORMANCE OF FOUR VARIETIES OF SQUASH

(Pamplémousses Experiment Station, 1977)

<i>Variety</i>	<i>Per hectare</i>	
	<i>Mean fruit number</i>	<i>Mean fruit weight (kg.)</i>
Golden Zucchini ...	30,000	7,781.7
Fordhook Zucchini ...	38,750	13,031.7
Benning's Green Tint ...	73,750	20,306.7
Golden Squash (Local) ...	66,667	12,250.0

There was much similarity between the fruits of Golden Zucchini and Fordhook Zucchini. Similarly fruits of Benning's Green Tint resembled Golden Squash (Local). They differed only in colour.

7.8.2. The best yield in terms of mean fruit number and mean fruit weight was obtained from variety Benning's Green Tint. The local variety gave a comparatively lower number of fruits than Benning's Green Tint but its yield was much higher than that of variety Golden Zucchini or Fordhook Zucchini. The marked difference in fruit weight between the local variety and Benning's Green Tint was caused by the difference in fruit size of these two varieties.

SCIENTIFIC OFFICER: K. F. LAN CHOW WING

7.9. OKRA (*Abelmoschus esculentus* (L) Moench)

7.9.1. Spacing and Nitrogen Fertilizer trial

Variety Perkins' Spineless was used in the trial, seedlings of which were transplanted to Pamplémousses Experiment Station on 21st October 1976. Layout was at 3^2 factorial with four replicates, and the treatments were as follows:

A	Spacing levels	...	$S_1 = 80 \text{ cm.} \times 30 \text{ cm.}$
			$S_2 = 80 \text{ cm.} \times 40 \text{ cm.}$
			$S_3 = 80 \text{ cm.} \times 50 \text{ cm.}$
B	Nitrogen levels	...	$N_1 = 63 \text{ kg N/ha.}$
			$N_2 = 94.5 \text{ kg N/ha.}$
			$N_3 = 126 \text{ kg N/ha.}$

7.9.2. Results are tabulated below.

TABLE 7.11

		YIELD IN m. TONS/ha.			Mean for spacing	
		N_1	N_2	N_3		
S_1	...	10.60 ^{ab*}	11.07 ^a	11.40 ^a	= 11.02	} S.E. = ± 0.21
S_2	...	8.96 ^c	9.53 ^{bc}	10.27 ^{ab}	= 9.59	
S_3	...	9.07 ^c	9.80 ^{bc}	9.51 ^b	= 9.46	
Mean for N.		9.54	10.13	10.39		
S.E. = ± 0.21						
S.E. for figures in body of table = ± 0.36						

7.9.3. A decrease in spacing significantly increased the yield. Increasing the N level also had a favourable effect, but it was significant only at the two larger planting distances. There was no strong interaction between spacing and nitrogen.

7.9.4. Variety Trial

The trial, which comprised two local and three imported varieties, was transplanted to Pamplémousses Experiment Station on the 1st December 1977. Spacing was 120 cm by 50 cm., and plot size 6.0 metres by 4.5 metres. The layout was in randomised blocks with four replicates.

- The varieties were:
1. Perkins' Spineless
 2. Clemson's Spineless
 3. Local (Barkly)
 4. Local (Piton)
 5. Dwarf Green Long Pod

The trial would be completed in the second quarter of 1978.

*Treatments with letters in common do not indicate significance at 5% level.

7.10. *TOMATO (Lycopersicon esculentum Mill)*7.10.1. (a) *Response to different cultural treatments*

The above trial was initiated at Pamplémousses Experiment Station using variety Venus. The seedlings were transplanted on the 9th June 1977, and harvest lasted from 17th August to 14th October. A randomised block layout was used, with four replicates.

Treatments were as follows:

A—Plants spaced at 90×50 cm., staked, and pruned (ie. all side shoots removed).

B—As above but with a spacing of 90×30 cm.

C—Plants spaced at 90×50cm., staked but not pruned.

D—As (C) but with a spacing of 90×30 cm.

E—Plants spaced at 90×50 cm., neither staked nor pruned.

F—As (E) but with a spacing of 90×30 cm.

7.10.2. The main results are summarised below:

TABLE 7.12

YIELD OF MARKETABLE FRUITS, No. OF MARKETABLE FRUITS AND FRUIT SIZE

<i>Treatment</i>		<i>Yield in m. tons/ha.</i>	<i>Mean No. of fruits/plant</i>	<i>Mean fruit size (g.)</i>
A	...	23.9 ^{c*}	11.6 ^b	92.7 ^a
B	...	32.1 ^{ab}	9.7 ^b	89.6 ^a
C	...	29.5 ^b	17.6 ^a	72.4 ^b
D	...	34.8 ^a	13.5 ^{ab}	70.3 ^b
E	...	19.6 ^c	13.7 ^{ab}	64.7 ^c
F	...	20.9 ^c	9.2 ^b	61.0 ^c
S.E:		± 1.66	± 0.77	± 2.56

*Treatments with letters in common are not significantly different at 5% level.

7.10.3 The highest yield for both levels of spacing, were obtained from the staking and no pruning treatment (C and D). Treatments E and F, where the plants were neither staked nor pruned had the lowest marketable yields. Yields were slightly reduced when the staked plants were pruned, though the effect was not significant at the smaller spacing. For all staked plants, whether pruned or not, plant spacing had a significantly favourable effect on yield. The biggest fruits were produced by pruned plants.

7.10.4 (b) *Variety Trial*

A trial was conducted at Richelieu Experiment Station in the summer months to compare the yield of nine varieties of tomato. Each plot, measuring 4.5 metres by 4.5 metres, had fifty plants spaced at 90 cm. by 45 cm. Layout was in randomised blocks with four replicates. The main results are tabulated below:

TABLE 7.13

MEAN YIELD IN M. TONS/HA. AND MEAN FRUIT WEIGHT

Variety			Yield (m. tons/ha)	Mean fruit Weight (g.)
1. Anahu	...	...	24.8 ^{a*}	121 ^c
2. Heinz 1370	...	...	23.0 ^{ab}	108 ^d
3. Moneymaker	...	...	20.6 ^{abc}	60 ^e
4. Tropic	...	...	18.9 ^{abcd}	156 ^{bc}
5. Venus	...	...	17.3 ^{bcde}	113 ^{cd}
6. Saturn	...	...	15.2 ^{cde}	113 ^{cd}
7. Ace 55 VF	...	...	13.4 ^{de}	188 ^{ab}
8. Marglobe	...	...	12.6 ^{de}	97 ^{de}
9. Delicious	...	...	12.4 ^{de}	217 ^a
S.E.	...	...	± 1.98	± 14.5

7.10.5 Most of the above varieties had been tested in a trial in the winter months of 1976. The present trial confirmed that Anahu, Moneymaker and Heinz 1370 were among the higher yield varieties. Among the newly imported varieties (Tropic, Ace 55 VF and Delicious), Tropic seemed to be most promising.

7.11. *BEAN (Phaseolus vulgaris)*7.11.1. *Spacing Trials*

(a) A spacing trial was conducted from November 1976 to January 1977 at Pamplémousses Experiment Station. Seeds of variety Long Tom were sown in twin rows 30 cm. wide in a randomised block layout with four replicates. Treatments were as follows:

(i) In-row spacings ... $I_1 = 5$ cm
 $I_2 = 10$ cm
 $I_3 = 15$ cm

(ii) Interrow spacings ... $S_1 = 45$ cm
 $S_2 = 60$ cm

No significant difference was found among the treatments. Average yield obtained was 14.7 m. tons/ha.

*Means followed by a common letter are not significantly different at 5% level.

7.11.2. (b) A second trial was conducted, again at Pamplémousses Experiment Station from 26th March to 2nd June. The spacing treatments, were modified and two nitrogen fertilizer levels were added. Treatments were as follows:

- (i) In-row spacings : $I_1 = 10$ cm
 $I_2 = 15$ cm
- (ii) Row spacings : $R_1 = 15$ cm (sowing in quadruple rows)
 $R_2 = 20$ cm (sowing in triple rows)
- (iii) Nitrogen levels : $N_1 = 250$ kg sulphate of ammonia/ha.
 $N_2 = 500$ kg sulphate of ammonia/ha.

7.11.3 The table below shows the yield obtained.

TABLE 7.14
YIELD OF GREEN PODS IN M. TONS/HA.

		N_1	N_2
I_1R_1	...	14.4 ^{c*}	15.9 ^{abc}
I_1R_2	...	15.0 ^{bc}	16.8 ^{ab}
I_2R_1	...	14.2 ^c	17.4 ^a
I_2R_2	...	15.0 ^{bc}	17.1 ^a

S.E.: ± 0.6

*Means followed by a common letter are not significantly different at 5 per cent level.

No difference was detected among the spacing treatments. However the N effect was found to be significant, with increased yield at the higher level.

SCIENTIFIC OFFICER: M. Y. BOODOO

7.12. TEA (*Camellia sinensis* (L) (O. Kuntze)

7.12.1 Research in clonal selection continued at Wooton Tea Experiment Station from fields of mature tea in the selection of high-performance mother-bushes superior to our control clone VPIH. The selection was performed on the criteria: (1) frame of bush, flushing ability, leaf pubescence, density of plucking points; (2) rooting capacity; (3) leaf fermenting ability and tea quality.

7.12.2 Concurrently long-term agronomic experiments were conducted to determine an optimal fertilisation for mature tea and the best cultural practices to be adopted to maximise yields.

7.12.3. *Clonal Selection*

7.12.4. *Chloroform tests*

From January to beginning of February, a total of 1164 chloroform tests in their third and fourth round were performed to assess the fermenting potential of mother-bushes in Fields 16 and 17. These were the last two fields in Wooton Station where selection had to be carried out. Clones having been selected after chloroform tests were the following: (i) F9/24; (ii) F9/25; (iii) F9/35; (iv) F9/42; (v) F9/56; (vi) F9/80.

7.12.5. *Rooting Trials*

Results of rooting trials which started in November 1976 were obtained in May 1977. 10 clones from Fields 20-21, 3 clones from "Observation Plots" and a single clone from Field 2, have been selected as shown in Table 7.15.

TABLE 7.15
PERCENTAGE SURVIVAL IN ROOTING TRIAL

Field No.		Clone No.	% Survival	% Survival VP 1H (Control)
20-21	...	... 7A/1	75.5	60
20-21	...	... 7A/33	75.5	60
20-21	...	... 7A/47	77.7	84.4
20-21	...	... 7A/52	75.5	84.4
20-21	...	... 7A/71	73.3	73.3
20-21	...	... 7A/164	77.7	73.3
20-21	...	... 7A/203	70.0	97.7
20-21	...	... 7A/212	83.3	97.7
20-21	...	... 7A/236	71.1	88.8
20-21	...	... 7A/23 A	75.5	88.8
14	...	... OBS 1	75.5	88.8
14	...	... OBS 3	73.3	82.2
14	...	... OBS 22	76.6	82.2
2	...	... FIA/311	71.1	83.3

From Clones F9/24, F9/25, F9/42, and F9/56, 45 whole leaf single-node cuttings were planted in November 1977 in the nursery with VP1H as control. Growth was poor and insufficient in clones F9/35 and F9/80 with the result that they could not be tested for their rooting capacity.

7.12.6. *Propagation*

In Field 5, clones F4/273, F4/275, F4/276, F4/278 have been found to perform better than VP1H after the usual fermentation and rooting tests and the organoleptic evaluation of their black tea. 60 cuttings of each of the four clones have been planted in November in the nursery. They will remain in the nursery for at least eighteen months for observations.

Thereafter they will be transplanted to the field to assess their (i) ability to withstand transplant shock (ii) pest and disease resistance (iii) response to high levels of fertiliser applications and (iv) their yields.

7.12.7. *Black Tea Mini-manufacture*

Out of 68 samples of black tea (orthodox mini—manufacture by Pizey Rollers) which were sent for tasting and pricing, 11 samples were not reported by the taster. Samples which were highly priced are listed below (Table 7.16).

TABLE 7.16
PRICES OF MADE TEA OF TEA CLONES

Field No.	Clone No.	Date of manufacture	Manufacturing Round	Price obtained Rs/Kg black Tea	Price VPIH Rs/kg black Tea	Remarks
2	... 1A/555	28.3.77	1st	16.50	11.00	Outstanding
5	... F4/276	18.1.77	3rd	13.00	10.50	Selected for propagation
5	... F4/273	18.1.77	4th	15.60	10.50	
5	... F4/275	22.2.77	3rd	14.00	12.60	
5	... F4/278	23.2.77	4th	10.00	11.00	

Black tea mini-manufacture, started late in December due to the dry spell prevailing from October to beginning of December, was impaired several times by unprogrammed electricity cut after rolling had begun or when about to dry the fermented material.

7.12.8. *Agronomic Experiments*7.12.9. *Experiment I: The optimum pruning cycle of tea*

The trial conducted in 14-15 Field of a mixed stand of Malayan—Nyasaland Jats, completed the 1st year of its 2nd cycle of 5 years. It had five treatments replicated over four blocks with 200 bushes per plot.

Treatments were as follows:

Treatment	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
T1	... Prune	Prune	Prune	Prune	Prune	Prune
T2	... Prune	Unprune	Prune	Unprune	Prune	Unprune
T3	... Prune	Unprune	Deepskiff	Prune	Unprune	Deepskiff
T4	... Prune	Unprune	Deepskiff	Deepskiff	Prune	Unprune
T5	... Prune	Unprune	Deepskiff	Unprune	Deepskiff	Prune

7.12.10 Deepskiff is a form of light pruning carried half-way between the pruning level and the initial tipping height.

TABLE 7.17
AVERAGE YIELD (KG. GREEN LEAF) OF EACH TREATMENT
(JULY 76 — JUNE 77)

Treatment	Mean Yield kg/plot	Yield/hectare
T ₁	... 189.65	14,646
T ₂	... 200.60	15,068
T ₃	... 177.60	14,617
T ₄	... 176.90	14,377
T ₅	... 190.90	14,450

The yields of green leaf between the treatments (Table 7.17) did not differ significantly at 5 per cent level. At this stage no definite conclusions may be drawn out.

7.12.11. *Experiment II: Effect of split doses of nitrogen on yield of tea*

The objective was to test the possibility of a yield increment by splitting the nitrogenous fertiliser dose over the year as compared to a single application. An experiment with 5 treatments replicated 4 times with 100 bushes per plot, was conducted in Fields 8 of Local Jat. It ended its 2nd cycle of 3 years in June 77. The dose of nitrogen was kept constant at 190 lb N/acre.

Treatments were as follows :

<i>Treatment</i>	<i>Time of application</i>	<i>Dose lb N/acre</i>
T ₁ (Single application)	Mid September	... 190
T ₂ (2 splits)	(i) Mid August	... 95
	(ii) December/January	... 95
T ₃ (3 splits)	(i) Mid August	... 70
	(ii) Mid December	... 60
	(iii) Mid March	... 60
T ₄ (4 splits)	(i) Mid August	... 50
	(ii) Mid November	... 50
	(iii) Mid January	... 50
	(iv) Mid March	... 40
T ₅ (5 splits)	(i) Mid August	... 40
	(ii) Mid October	... 40
	(iii) Mid December	... 40
	(iv) Mid February	... 40
	(v) Mid April	... 30

TABLE 7.18

AVERAGE YIELD (KG. GREEN LEAF) PER YEAR OVER 3 YEARS
(JULY 1974 — JUNE 1977)

<i>Treatments</i>	<i>Mean Yield per plot</i>	<i>Yield/hectare</i>
T ₁	... 109.40	13,516
T ₂	... 109.83	13,568
T ₃	... 108.38	13,390
T ₄	... 111.18	13,736
T ₅	... 110.28	13,625

The results confirmed those of the previous cycle in that the yields between the treatments did not differ significantly at 5% level. T₁ may not be recommended to safeguard against leaching losses especially in the super-humid zone. Since labour cost for fertiliser broadcasting is high, T₂ and T₃ may continue to be the recommended practice. Thus August, January and March in case of 3 split applications, would be the appropriate time of the year to carry out fertilisation of tea plantations.

7.12.12. *Experiment III: The optimum dose of nitrogen for tea*

This trial started in 1971 in Field (9-10) of Selected Local Jat and ended its 2nd cycle of 3 years in June 1977. It consisted of five treatments replicated over four blocks with 200 bushes per plot. Basal doses of muriate of potash and triple superphosphate were applied at 32 kg/acre and 48 kg/acre respectively in two split applications.

Treatments were as follows:

<i>Treatment</i>		<i>Dose lb N/acre</i>	<i>Time of application</i>
T ₁	...	150	Each treatment was applied in 3 splits
T ₂	...	200	(i) Mid September
T ₃	...	250	(ii) Mid November
T ₄	...	300	(iii) Mid February
T ₅	...	350	

TABLE 7.19

AVERAGE YIELD (KG GREEN LEAF) PER YEAR OVER 3 YEARS
(JULY 74 — JUNE 77)

<i>Treatment</i>		<i>Mean yield per plot</i>	<i>Yield/hectare</i>
T ₁	...	236.2	14,591 ^b
T ₂	...	259.1	16,005 ^a LSD at 5% — 1411.5
T ₃	...	273.8	16,914 ^a LSD at 1% — 1978.9
T ₄	...	284.0	17,544 ^a S.E. of mean = 458.4
T ₅	...	261.0	16,123 ^a

Means followed by a common letter were not significantly different at 5% level according to Duncan's Multiple Range Test. T₁ (300 lb N (acre) seems to be the optimum dose of nitrogen when muriate of potash and triple super phosphate were applied at basal doses (Table 7.19.).

7.12.13. *Experiment IVA: Uptake of phosphorus in presence of mulch*

This experiment started in 1976 in Field 16 of Malayan Jat and consisted of 5 treatments replicated over 4 blocks in a complete randomised block design. Each plot received 375 kg of the mulch allotted to it except for the control plots.

Treatments were as follows:

T ₁	...	...	Pruning Litter
T ₂	...	...	Bagasse
T ₃	...	...	Control—No mulch
T ₄	...	...	Sawdust
T ₅	...	...	Teawaste

TABLE 7.20

AVERAGE YIELD (KG GREEN LEAF) FOR EACH TREATMENT
(JULY 76 — JUNE 77)

<i>Treatments</i>		<i>Mean Yield/ hectare</i>
T ₁	...	15,192 ^a
T ₂	...	13,482 ^{ab}
T ₃	...	13,415 ^{ab}
T ₄	...	11,811 ^b
T ₅	...	13,946 ^a

S.E. of mean = 578

LSD 5% = 1791

LSD 1% = 2510

Means followed by a common letter are not significantly different at 5% level according to Duncan's Multiple Range Test. Pruning litter seemed to be the best mulch for use in tea interrows. Besides it is very easy to obtain as compared to bagasse or tea waste.

TABLE 7.21

AVERAGE PHOSPHORUS LEVELS IN SOIL, 1st LEAF AND 3rd LEAF
(NOVEMBER 1976 — JUNE 1977)

<i>Dates</i>	<i>Soil P available ppm</i>	<i>1st leaf P % DM</i>	<i>3rd leaf P % DM</i>
4.11.76	... 68.30	0.46	0.336
10.12.76	... 42.50	0.50	0.392
18. 1.77	... 29.35	0.482	0.368
23. 2.77	... 28.02	0.459	0.347
22. 3.77	... 41.20	0.467	0.373
3. 5.77	... 72.55	0.483	0.333
25. 5.77	... 61.40	0.474	0.332
27. 6.77	... 80.95	0.463	0.327

Calculation of correlation coefficients showed that there is a high correlation between phosphorous levels of 1st leaf and 3rd leaf. However no correlation seemed to exist between soil available phosphorus and the phosphorus level of the leaves since the correlation coefficients showed a wide variability.

7.12.14. Experiment VA: Effect of NPK application

In the year of prune followed by application of N only during subsequent years prior to next prune as compared to NPK in year of prune followed by NPK in subsequent years.

This trial completed the 2nd year of its 2nd cycle of 3 years. It was conducted in Field 16 of Malayan Jat and consisted of three treatments replicated over seven blocks with 200 bushes per plot. The rate of nitrogen application was kept constant at 80 lb per acre in all treatments.

Treatments were as follows:

	<i>Year 0</i>	<i>Year 1</i>	<i>Year 2</i>
T ₁	NPK 1 : 2 : 2	N only	N only
T ₂	NPK 1 : 2 : 2	NPK 25 : 5 : 5	NPK 25 : 5 : 5
T ₃	NPK 25 : 5 : 5	NPK 25 : 5 : 5	NPK 25 : 5 : 5

TABLE 7.22

AVERAGE YIELD (KG GREEN LEAF) FOR EACH TREATMENT
(JULY 1976 — JUNE 1977)

<i>Treatment</i>		<i>Average yield per plot</i>	<i>Yield/hectare</i>
T ₁	...	183.04	11,305
T ₂	...	162.90	10,062
T ₃	...	163.30	10,087

The yields of green leaf between the treatments did not differ significantly at 5% level. Valid conclusions may be drawn out only after the trial will have completed its cycle.

7.12.15. *Experiment VII: Optimum time of prune*

The trial consisted of 6 treatments replicated over four blocks in Field 4 of Malayan Jat with 200 bushes as plot size. It completed the 2nd year of its 2nd cycle of 3 years.

Treatments were as follows:

T ₁	...	...	Prune in March
T ₂	...	...	Prune in April
T ₃	...	...	Prune in May
T ₄	...	...	Prune in June
T ₅	...	...	Prune in July
T ₆	...	...	Prune in August

Pruning heights were kept constant in all treatments.

TABLE 7.23

AVERAGE YIELD (KG GREEN LEAF) OF EACH TREATMENT
(JULY 1976 — JUNE 1977)

<i>Treatments</i>		<i>Mean Yield per plot</i>	<i>Yield/hectare</i>
T ₁	...	97.28	17,475
T ₂	...	100.24	18,006
T ₃	...	98.41	17,680
T ₄	...	96.89	17,406
T ₅	...	101.48	18,229
T ₆	...	99.45	17,865

The yields of green leaf between treatments did not differ significantly at 5% level. The winter period May-July appeared to the most appropriate time of the year for pruning operations.

7.12.16. *Experiment VIII: Optimum pruning height of tea*

In a complete randomised block design, 4 treatments were replicated over 4 blocks in Field 4 of Malayan Jat. The experiment completed its 1st cycle of 3 years.

Treatments were as follows:

T ₁	...	...	Prune at 24" from ground level
T ₂	...	...	Prune at 26" from ground level
T ₃	...	...	Prune at 28" from ground level
T ₄	...	...	Prune at 30" from ground level

TABLE 7.24

AVERAGE YIELD (KG GREEN LEAF) OF EACH TREATMENT
(JULY 1974 — JUNE 1977)

Treatments	Yield/hectare
T ₁ ...	14,327
T ₂ ...	13,250
T ₃ ...	14,001
T ₄ ...	12,933

The yields of green leaf between treatments were not significant at 5% level.

7.12.17. *Experiment IX: Optimum tipping height for tea*

This trial completed the 2nd year of its 2nd cycle of 3 years. It consisted of 4 treatments replicated over 4 blocks in Field 2 of Local Jat.

Treatments were as follows:

T ₁	...	...	Tipping at 4" above pruning level
T ₂	...	...	Tipping at 5" above pruning level
T ₃	...	...	Tipping at 6" above pruning level
T ₄	...	...	Tipping at 8" above pruning level

Pruning heights were kept constant in all treatments.

TABLE 7.25

AVERAGE YIELD (KG GREEN LEAF) FOR EACH TREATMENT
(JULY 1976 — JUNE 1977)

Treatments	Mean yield per plot	Yield/hectare	
T ₁ ...	298.84	18,461 ^b	
T ₂ ...	307.68	19,007 ^a	LSD at 5% 1757
T ₃ ...	305.42	18,869 ^a	LSD at 1% 2463
T ₄ ...	348.06	21,503 ^a	S.E. of mean = 569

According to Duncan's Multiple Range Test, yields of green leaf between treatments followed by a common letter are not significant at 5% level. Tipping at 8" above pruning level gave the highest yield. This trend was observed for treatment T₄ throughout the previous cycle.

7.12.18. *Experiment X: Optimum dose of nitrogen for tea*

The objective was the same as for experiment III with the exception that lower doses of nitrogen were tested in experiment X. The latter had 4 treatments replicated over 6 blocks and each plot consisted of 200 bushes. The experiment completed the 2nd year of its 2nd cycle of 3 years.

Treatments were as follows:

- T₁ : 80 lb N/acre p.a.
 T₂ : 100 lb N/acre p.a.
 T₃ : 120 lb N/acre p.a.
 T₄ : 140 lb N/acre p.a.

TABLE 7.26

AVERAGE YIELD (KG GREEN LEAF) OF EACH TREATMENT
 (JULY 1976 — JUNE 1977)

<i>Treatments</i>		<i>Mean yield per plot</i>	<i>Yield/ hectare</i>
T ₁	...	214.3	16,469
T ₂	...	209.9	16,131
T ₃	...	214.5	16,479
T ₄	...	231.4	17,784

The results showed an increase in yield of green leaf with increasing doses of nitrogen application. However the yields of green leaf between the treatments did not differ significantly at 5% level.

7.12.19. *Grafting*

It was decided that the tea seed garden at Central Experiment Station, Reunion would be closed. Consequently cuttings of Reunion clones found on that station were taken in March to be grafted at Wooton Station. Cuttings of Reunion clone 16 were grafted on 4 stocks of Local Jat, only one graft survived. Cuttings of Reunion clone 110 were grafted on 10 stocks of Local Jat, but none survived.

SCIENTIFIC OFFICER: S. SEERUTTUN

7.13. *Citrus (Citrus spp.)*

7.13.1. The plants at palmar (grafted with disease-free budwood obtained from Reunion in 1976) showed severe signs of deficiency caused by high alkalinity and salinity. Fertilization and heavy manuring have helped the plants to recover.

A second batch of thirty-five plants were planted by the end of March and are doing well.

Cover crops of *Vigna marina* were sown in both orchards and produced a luxuriant growth, thus helping to keep down weeds and enriching the poor sandy soil. Wind-breaks were maintained around the plants for protection.

7.13.2. These plants will serve as mother plants for the propagation of disease-free budwood.

7.14. *Grapes (Vitis vinifera L.)*

7.14.1. The two stock/scion compatibility trials replicated at Plaisance Experiment Station and Richelieu Experiment Station were fertilized, manured and mulched at the beginning of the year. The plants became dormant around March-April, and sprouted about the end of September. The plants were in a poor condition, because of wind damage and severe drought during sprouting and subsequent growth.

7.14.2. A cover crop of *Vigna marina* was sown at Plaisance and provided good cover rapidly.

7.14.3. Grape cuttings were received from Australia around mid-July and consisted of ten varieties of table grapes, and five varieties of rootstocks, all of which were grown in the greenhouse at Reduit.

7.15. *Papaya (Carica papaya L.)*

7.15.1. Two observational trials were carried out at Richelieu Experiment Station and Central Experiment Station with Hawaiian varieties Solo Waimanalo (Low Bearing) and Solo Sunrise respectively.

7.15.2. Both varieties will be included in a variety trial to compare them to the popular Wilcox variety and to Chinese varieties.

7.15.3. The fruits of Waimanalo variety were good in taste, but those of Solo Sunrise were better though smaller. The first fruits were harvested about 9-10 months after planting, and harvest lasted 8-9 months. The ripening rate was very low in winter, hence very few fruits were harvested during that period.

7.16. *Anthurium (Anthurium spp.)*

7.16.1. The flowers were bearing seeds in the early part of the year (after the heavy summer rains) and about three hundred seeds were sown at Barkly Experiment Station. About eighty seedlings maintained a normal slow rate of growth and were about one inch tall by December (after more than eight months of growth). Very few seeds were obtained during winter and germination was severely affected by cold weather. In December many seedlings were damaged by tenrec, only fortyfive seedlings were potted.

7.16.2. The growing medium trial was delayed as the enlargement of the shed slowed down due to shortage of building material. The work was postponed because of further delay in the purchase of shading material and plants.

7.17. *Strawberry (Fragaria spp.)*

7.17.1. The variety trial, and planting date trials varieties Tioga and Fresno, were not carried out because of shortage of planting material (as a result of severe drought conditions and insufficient irrigation water at Central Experiment Station, which adversely affected the imported varieties). A

planting date trial was carried out with the Local variety, at Curepipe Experiment Station, but excessively cold and humid conditions during the flowering and fruit set period (August-October) caused a very high incidence of fruit rot, and no fruit of marketable quality.

7.17.2. The propagation plots at Central Experiment Station, Reduit again suffered from drought and heat during the late part of the year, while those at Curepipe Experiment Station suffered from cold humid conditions.

SCIENTIFIC OFFICER : S. N. NAIDU

7.18. *Weed Control*

7.18.1. A trial was started on 31.8.77 at Richelieu Experiment Station to investigate the critical periods of weed competition in tobacco (*Nicotiana tabacum*), and to ascertain thereby the stage at which weed control will be more effective in improving tobacco yield. The trial will be determined at the end of January 1978.

7.19. *Biometry*

7.19.1. A sampling scheme was designed for the estimation of *Stomoxys nigra* populations. Results were analysed for a study of the age-structure and density of *S. nigra* populations occurring at various times during the sugarcane harvest season.

7.19.2. An experiment was designed to investigate the effects on growth rate of the addition of acacia and molasses at various levels to the diet of cattle, and the data obtained were analysed using covariance techniques.

7.19.3. Results were analysed for a study of the response to overhead irrigation of sugarcane fields in the Northern Plains Irrigation Project. Experiments were also designed for the assessment of the efficacy of several inoculation methods, ages of plant and strains of virus in demonstrating the resistance or susceptibility of various tobacco varieties.

7.19.4. Statistical advice on experimental design and analysis of data was given to several Scientific Officers of the Ministry in connection with experiments in their respective fields of research.

SCIENTIFIC OFFICER : V. VEERAPA

7.20. *Soya Bean*

7.20.1. The International Soy Bean Variety Evaluation Experiment 604B (Intsoy) was performed at Pamplémousses Experiment Station from April to September. The experiment consisted in the comparison of sixteen varieties of Soya Bean namely Cobb, Bossier, Davis, Forrest, Williams, B-1, Ransom, Columbus, Mitchell, Calland, Kahala, Clark 63, Essex, Rillito, Bragg and the local variety. These sixteen varieties were replicated four times in a randomised block design, each plot containing four rows.

- 7.20.2. The following information were collected from each plot:
- (i) Nodulenumber and weight from five plants (randomly selected) in the two outer rows of each plot;
 - (ii) Plant Height;
 - (iii) Amount of lodging;
 - (iv) Percentage shattering;
 - (v) No. of plants in each of the two inner rows;
 - (vi) No. of pods per plant;
 - (vii) Grain yield;
 - (viii) Weight of one hundred randomly collected seeds;
 - (ix) Quality of seeds (depending upon amount of wrinkling, defective seed coat, greenishness or rotten seeds).

These information were forwarded to Intsoy for analysis. A seed sample from each variety was collected and sent to Intsoy for protein and oil analysis.

7.20.3. The following table gives the average grain yield of each of the sixteen varieties.

TABLE 7.27
GRAIN YIELD (M. TONS/HA.)

<i>Variety</i>	<i>Average Grain Yield</i> (<i>m. tons/ha.</i>)
Cobb	... 1.66
Bossier	... 1.93
Davis	... 2.34
Forrest	... 2.45
Williams	... 2.13
B-1 ...	... 2.06
Ransom	... 2.12
Columbus	... 1.94
Mitchell	... 2.11
Calland	... 2.39
Kahala	... 2.27
Clark 63	... 2.04
Essex	... 1.94
Rillito	... 2.04
Bragg	... 2.43
Local Variety	... 1.45

7.21. *Pea*

7.21.1. A fertiliser trial was performed on local pea at Curepipe Experiment Station from mid-June to mid-October. The treatments were three levels of nitrogen namely 20, 30 and 40 kg. N per ha. and two levels of potash namely 72 and 108 kg. K₂O per ha. These treatments were replicated 4 times in a randomised block design.

7.21.2. Analysis of the results showed that there was no significant yield difference between the different treatments.

The yields obtained were very low as a large proportion of the peas were eaten up by birds.

SCIENTIFIC OFFICER: O. BISSONAUTH

7.22. Fodder

7.22.1. Sugar cane (*Saccharum officinarum*)

7.22.2. The Agronomy Division started three experiments in 1974 at Richelieu Experiment Station in order to determine suitable Agronomic practices in the cultivation of sugar cane (Variety S 17) as a potential source of fodder. Of these, the experiment designed to investigate the effects of different row-spacings and the one aimed at the determination of the optimal cutting interval suffered severe attack by the insect *Pulvinaria iceryi* ("pou a poche blanche") and had to be discontinued. The third experiment on the optimal time of planting escaped attack by this insect and is still in progress. The mean yield of fresh cane (stalks and tops) in metric tons per hectare per year for the second harvest (October 1976 to September 1977, according to treatment) is shown in Table 7.28.

TABLE 7.28

YIELD OF FRESH CANE (STALKS + TOPS) IN MILLION TONS HA. ⁻¹ YR. ⁻¹		
Planting date	Date of second harvest	Mean Yield
October 1974	October 1976	72.22
November 1974	November 1976	70.97
December 1974	December 1976	70.28
January 1975	January 1977	73.15
February 1975	February 1977	85.25
March 1975	March 1977	96.03
April 1975	April 1977	78.78
May 1975	May 1977	87.42
June 1975	June 1977	86.16
July 1975	July 1977	76.90
August 1975	August 1977	53.50
September 1975	September 1977	85.00
L.S.D. at 5% level = 15.20		
S.E. of means = 5.26		

At this stage it would appear that late-summer and winter planting gives higher yields of fresh cane than early summer planting.

Data on other parameters investigated appear in Table 7.29.

where w = mean weight of fresh whole cane in grams;

l = mean length of fresh whole cane in cm;

ϕ = mean diameter of stalk in cm;

and r = ratio of mean stalk weight to mean weight of whole cane.

TABLE 7.29

7.22.3 RECORDED CHARACTERISTICS OF FODDER CANE

Planting date		w	l	$\ominus$	r
October 1974	...	1,086	273.0	2.50	0.90
November 1974	...	1,487	317.0	2.80	0.91
December 1974	...	939	269.0	2.50	0.87
January 1975	...	1,037	272.7	2.45	0.83
February 1975	...	1,356	321.9	2.65	0.85
March 1975	...	1,149	319.9	2.55	0.87
April 1975	...	1,722	351.7	3.10	0.85
May 1975	...	1,447	341.2	2.70	0.82
June 1975	...	1,279	292.5	2.50	0.83
July 1975	...	923	288.6	2.30	0.82
August 1975	...	1,392	323.0	2.70	0.85
September 1975	...	1,306	322.0	2.60	0.91

Figures from Table 7.29. are in agreement with the above conclusion in so far as late-summer and winter-planting yield taller and heavier canes. However, there does not appear to be appreciable differences in the diameter of stalks and the ratio of stalkweight to whole cane weight.

7.23. Grass variety trials

7.23.1. The experiments designed to compare the suitability of 8 grass species at Curepipe Experiment Station and of 9 species at Palmar Livestock Breeding Station were pursued and are still in progress.

At Curepipe Experiment Station, the experiment now comprises only 6 species owing to the unsatisfactory performance of *Cenchrus ciliaris* and *Chloris gayana*, which have therefore been removed. Two harvests were carried out during the year viz. March and August. The mean fresh yield in metric tons per hectare for each harvest is presented in Table 7.30.

TABLE 7.30

FRESH YIELD OF 6 GRASS SPECIES IN M. TONS Ha.
CUREPIPE EXPERIMENT STATION

-1

Species	Harvest date	
	March 77	August 77
Bracharia ruziziensis	... 58.11	27.80
Bracharia brisantha	... 57.84	48.23
Setaria sphaecelata var. Bua River	... 55.60	49.35
Pennisetum purpureum	... 50.19	40.58
Panicum maximum	... 41.23	38.81
Tripsacum laxum	... 36.94	54.48
S.E. of a mean	... 12.20	6.24
L.S.D. at 5%	... 36.75	18.80

7.23.2. No significant difference in fresh yield was observed among the species for the March harvest, although there are indications of *P. maximum* and *T. Laxum* being relatively poor-yielding. However, differences between species were highly significant for the August (winter) harvest when *T. Laxum* proved to be the highest yielder, and *B. ruziziensis* suffered an appreciable drop in fresh yield; all other species gave slightly reduced yields compared to their March performance, and did not differ among themselves at their harvest. It is worth noting that the March harvest came after 3.5. months of a rainy summer growth while the August harvest resulted from 5 months of winter growth.

7.23.3. At Palmar Livestock Breeding Station, seven harvests were made during the year. The mean fresh yield in m. tons per hectares for the year are presented in Table 7.31.

TABLE 7.31

FRESH YIELD OF 9 GRASS SPECIES IN M. TONS Ha.⁻¹
AT PALMAR LIVESTOCK BREEDING STATION

Species	Yield
Pennisetum purpureum ...	237.9
Panicum maximum ...	157.2
Setaria sphaecelata var. Bua River ...	149.5
Bracharia ruziziensis ...	141.2
Chloris gayana ...	122.6
Bracharia brizantha ...	108.3
Cenchrus ciliaris ...	105.4
Digitaria decumbens ...	97.8
Pennisetum clandestinum ...	92.5
S.E of a mean=10.0	
L.S.D. at 5% =29.1	

Highly significant differences were recorded among the nine species. *P. purpureum* is clearly the best yielder followed by *P. maximum*, *S. sphaecelata*, *B. ruziziensis* and *C. gayana*, all of which gave satisfactory yields. It should be mentioned, however, that the yield of *P. purpureum* as quoted above includes stemmy material which may not be acceptable to cattle.

7.23.4. Observation trial with Elephant grass

A plot of 100 square metres has been planted on 15.2.77 at Plaisance Experiment Station with Elephant grass variety Kisozi in furrows 60 cm apart with double row of cuttings. Three harvests have been made and the fresh yield data shown in Table 7.32.

TABLE 7.32

FRESH YIELD OF ELEPHANT GRASS VARIETY KISOZI

Date of harvest	Yield in m. tons ha ⁻¹
29.4.1977 ...	30.25
1.7.1977 ...	38.80
1.9.77 ...	31.90

7.24 *Acacia (Leucaena Leucocephala)*

7.24.1. *Optimum spacing trial*

An experiment to investigate the optimal interrow spacing in acacia variety Peru was started in late June at Richelieu Experiment Station, arranged in 5 randomised blocks with 4 treatments viz. 90 cm, 180 cm, 270 cm and 360 cm between rows. Growth has been satisfactory and the first harvest is scheduled for February 1978.

7.24.2. *Seed production potential of acacia*

An observational trial on the seed production potential of accacia variety Peru was set up at Richelieu Experiment Station in mid-August. Four plots, each of 65 m², have been planted and the first seed collection will be in June 1978.

BELLE VUE STATION

CHINESE AGRICULTURAL TECHNICAL TEAM

7.25 *Development*

About 125 metres of farm road were improved. Slightly less than one arpent of land under bush was cleared and planted to sweet potato, peanut, soyabean and sugarcane. A corrugated iron sheet mushroom shed measuring 9.5 m × 2.8 m was built. A concrete combined machine shed/store 21 m × 7.5m was also constructed.

7.26 *Report for period covering January to June 1977*

7.26.1. Area under rice cultivation at Belle Vue Station was 5.80 arpents giving an average paddy yield of 2.96 metric tons per arpent. There were 3.54 arpents devoted to production and 2.26 arpents to various experiments. The average paddy yield was 3.72 metric tons and 2.67 metric tons per arpent for production and experiment respectively.

7.26.2. *Rice variety trial 1*

Design	...	...	Six randomised complete blocks of six plot each
Plot size	...	...	15 m ² (8.3 m × 1.8 m)
Spacing	...	...	20 cm × 16 cm
Fertilizer	...	...	9,000 kg cow manure + 600 kg chicken manure + 63 kg single superphosphate to the arpent as basal dressings. 630 kg chicken manure + 98.5kg ammonium sulphate (in two split applications) + 51 kg muriate of potash to the arpent as top dressings.

The mean paddy yields were 2.87, 2.98, 3.13, 3.29, 3.32 and 3.43 metric tons respectively for varieties Red Plum Zao, Kwang Loo i no. 4, Nanking no. 11, Chen Chu i no. 11, TN1 (check) and Kwang Er i 5-3. There was no significant difference in the mean paddy yield among the varieties tested.

7.26.3. Rice variety trial 2

Design and other details of experiment were same as for variety trial 1.

Results are tabulated below:

TABLE 7.25.1
MEAN PADDY YIELD

Variety	Kg/15 m ²	difference						
Kwang Er i 5-3	12.18	—	—	—	—	—	—	—
TN1 (Check)	11.06	1.12	—	—	—	—	—	—
Kwang Tan i	10.51	1.67	0.55	—	—	—	—	—
Ban Selected no. 2	10.46	1.72	0.60	0.50	—	—	—	—
Chew Chan i no. 39	10.08	2.10*	0.98	0.43	0.38	—	—	—
Kwang Hua i no. 4	8.86	3.32**	2.20*	1.65	1.60	1.22	—	—

The difference in mean yield among the varieties was significant (F value 2.96; P 0.05). Variety Kwang Er i 5-3 was the top yielder followed by TN1 (Check). However, difference in the yield between them did not reach significance level.

7.26.4. Spacing trial

Design randomised complete block with four replications

Plot sizes 12.0m² to 13.5m²

Rice variety TN1

Results are presented in table 7.25.2

TABLE 7.25.2
MEAN PADDY YIELD

Treatment cm×cm	Code	Kg/15m ²	difference						
23×10	G	11.41	—	—	—	—	—	—	—
20×13	E	10.83	0.58	—	—	—	—	—	—
33×10	B	10.64	0.77*	0.19	—	—	—	—	—
26×13	A	10.53	0.88*	0.30	0.11	—	—	—	—
20×16	C	10.52	0.89*	0.31	0.12	0.01	—	—	—
16×16	F	10.41	1.00*	0.42	0.23	0.12	0.11	—	—
26×10	D	10.37	1.04**	0.46	0.27	0.16	0.15	0.04	—

From analysis of variance, there were significant differences in mean paddy yields among the treatments. The yield difference between G and B, G and A, G and C, G and F was significant, whereas that between G and D was highly significant.

7.26.5. Response of single superphosphate experiment

The experiment was carried out for the third season; Four levels of single superphosphate (19% P_2O_5) were compared:— 0 kg, 63.3 kg, 94.0 kg and 126 kg applied as basal dressing to the arpent.

Design	...	...	Randomized complete block with four replications
Plot size	...	...	12.25 m ² (3.5 m × 3.5m)
Spacing	...	...	20 cm × 16 cm
Rice variety	...	...	TN 1

FERTILISER REGIME COMMON TO ALL TREATMENTS

Fertiliser		Total Kg/arpent	Basal	Tillering	Panicle initiation	Heading
N	...	53	25%	50%	13%	12%
K ₂ O	...	38	50%	—	50%	—

The N and K₂O are in forms of ammonium sulphate and muriate of potash.

RESULTS

TABLE 7.25.3

MEAN PADDY YIELD

Treatment	Code	Kg/12.25m ²	difference		
0	...	A	9.74		
63.3	...	B	10.08	0.34**	
94.0	...	C	10.22	0.48**	0.14
126.0	...	D	10.42	0.68**	0.34** 0.20
L.S.D. 5% 0.21					
1% 0.34					

Difference in yields between treatments was highly significant. Treatment A (check) gave significantly lower yield than all the rest and reached 1% level. Yield difference between D and B was highly significant but not significant between D and C.

7.26.6 Response of muriate of potash experiment

Four levels of muriate of potash (60% K₂O) were compared:—(A) 0 kg, (B) 31 kg, (C) 63 kg, and (D) 94 kg per arpent. Half the total quantity of K₂O was applied as basal dressing and the rest at panicle initiation stage. The experiment was carried out for the third time.

FERTILISER REGIME COMMON TO ALL TREATMENTS

Fertiliser		Total Kg	Basal	Tillering	Panicle initiation	Heading
N	...	53	25%	50%	13%	12%
P ₂ O ₅	...	25	100%	—	—	—

N and P₂O₅ in forms of ammonium sulphate and single superphosphate.

RESULTS

The mean paddy yields were 3.55, 3.47, 3.57 and 3.61 tons per arpent for treatments A, B, C and D respectively. As in the two previous experiments, the statistical results showed no significant differences in mean paddy yield among the treatments.

7.26.7. *Split application of ammonium sulphate experiment*

There were four treatments:—A (check), B, C and D.

SPLIT APPLICATION OF AMMONIUM SULPHATE EXPERIMENT

Fertiliser	Total N Kg	Basal	Tillering	Panicle initiation	Heading
A (check)	53	30%	40%	15%	15%
B	53	30%	40%	30%	—
C	53	30%	40%	—	30%
D	53	40%	60%	—	—

25 kg P_2O_5 and 19 kg K_2O were applied in forms of single superphosphate and muriate of potash to the arpent as basal dressings and 19 kg K_2O as top dressing at panicle initiation to all treatments. Design, plot size, spacing and rice variety were same as single superphosphate experiment 7.25.5.

RESULTS

TABLE 7.25.4
MEAN PADDY YIELD

Treatment	Kg/12.25m ²	difference		
A	11.65	0.88**	—	—
B	10.77	0.88*	—	—
C	11.59	0.06	0.82*	—
D	11.26	0.39	0.49	0.33

L. D. S. 5% 0.61

1% 0.87

From analysis of variance, yield difference among treatments was significant. Treatment A gave the highest and B the lowest yield respectively. Yield difference between A and B, C and B was significant, whereas that between A and C was very significant. There was no significant yield difference among treatments A, C and D.

7.26.8. *Organic manure experiment*

Each treatment received an equivalent of 53 kg N per arpent. Half of the total N was applied basally as organic forms except for D where ammonium sulphate was used. The other half was applied as top dressing using ammonium sulphate.

A	compost	...	2.27% N D.M.
B	Cow manure	...	2.67% N D.M.
C	Chicken manure	...	2.86% N D.M.
D	Ammonium sulphate		21.00% N D.M. (check)

Design, plots size, spacing, rice variety, fertilisation of P_2O_5 and K_2O were the same as experiment 7.26.7.

TABLE 7.25.5
MEAN PADDY YIELD

Treatment	Kg/12.25m ²	difference		
		—	—	—
A	10.81	—	—	—
B	11.18	0.37	—	—
C	11.76	0.95**	0.58*	—
D	11.07	0.26	0.11	0.69*
L.S.D. 5%	0.55			
1%	0.79			

There was significant difference in yield between the treatments. Treatment C gave the highest yield followed by B. The yield difference between C and B, C and D was significant, whereas that between C and A was very significant. The yield difference among treatments A, B and D was not significant.

7.26.9. *Rice variety trial in 1st year ratoon sugarcane interrows*

Design	...	...	randomised complete block with 4 replications
Treatments	...	...	Lew Sew Chao, Kwang Chiet Chew, Er Chu Chin and Red Plum Zao (check)
Plot size	...	...	22.86 m ² (9 m ² for rice)
Spacing	...	...	Seven rows of rice at 20 cm apart in the 7 ft sugarcane interrow. Rice row width was 3.4 cm.
Seed rate (rice)	...	...	69 kg/arpent (pure stand)
Sugarcane variety	...	...	M 13/56
Sugarcane spacing	...	...	3ft × 7ft.
Basal dressings (rice)	...	...	90 kg single superphosphate + 31 kg ammonium sulphate + 31 kg muriate of potash per arpent pure stand.
Top dressings (rice)	...	...	90 kg ammonium sulphate each per arpent pure stand at 3 leaf stage and 5 leaf stage. 60 kg ammonium sulphate + 31 kg muriate of potash per arpent pure stand at 7-8 leaf stage.

RESULTS

TABLE 7.25.6
MEAN PADDY YIELD (MIXED STAND)

Variety	Kg/arpent	difference		
		—	—	—
Lew Sew Chao	743.4	—	—	—
Kwang Chiet Chow	696.0	47.4	—	—
Er Chu Chin	689.5	53.9	6.5	—
Red Plum Zao (CK)	581.8	161.9**	114.2**	107.7**

Statistical analysis showed no significant differences in yield among the varieties Lew Sew Chao, Kwang Chiet Chew and Er Chu Chin. These varieties gave higher yield than the control variety Red Plum Zao was highly significant.

7.26.10. *Rice variety trial in virgin sugarcane interrows*

Design ...	...	...	Randomized complete block with six replications
Treatments ...	...	...	Chan Chu i No. 11, Kwan Loo i No. 4, Red Plum Zao (check)
Plot size ...	...	...	25.4 m ² (mixed stand)
Percentage of sugarcane land occupied by rice cultivation: 39.4			
Spacing ...	...	...	6 rows of rice at 20 cm arpent in the 6 ft interrow
Sugarcane variety ...	...	...	S 17
Sugarcane spacing ...	...	...	4 ft × 6 ft

Seed rate, basal dressings and top dressings (except at 5-6 leaf stage, 69 kg ammonium sulphate instead of 90 kg were applied to the arpent pure stand) were same as rice variety trial in 1st year ratoon sugarcane interrows—7.25.9.

RESULTS

The paddy yield of Chen Chu i no. 11, Red Plum Zao and Kwang Loo i no. 4 were respectively 761.2 kg, 662.2 kg, and 629.0 kg per arpent mixed stand. Yield differences among the varieties were insignificant.

7.26.11. *Rice seed rate trial in virgin sugarcane interrows*

Design ...	...	...	randomized complete block with four replications
Treatments ...	...	...	(A) 47 kg, (B) 57 kg, (C) 66 kg and (D) 76 kg (check) seeds per arpent pure stand
Sugarcane variety ...	...	...	M 13/56

Rice variety: Red Plum Zao.

Plot size, sugarcane spacing, rice spacing, percentage of sugarcane land under rice and basal dressings were same as rice variety trial in virgin sugarcane interrows—7.25.10.

Top dressings (rice)—90 kg. and 63 kg. ammonium sulphate at 3 leaf and 5 leaf stage respectively and 31 kg. muriate of potash at 8 leaf stage per arpent pure stand.

Results:

The yield differences among treatments were not significant. The respective paddy yields of B, A, C and D were 610.8 kg., 602.6 kg., 589.6 kg. and 569.3 kg. per arpent mixed stand.

7.26.12. *Three rice croppings per annum trial*

The trial was started in mid July 1976 and ended on 8th June 1977.

Two fields were selected for the trial: Block III field 5 and field 6 with a total area of 0.34 arpent.

Results are presented in table 7.25.7.

TABLE 7.25.7.

PADDY YIELD

Gropping		Transplanting to harvest	Variety		Kg/arpent	
			field 5	field 6	field 5	field 6
1st	...	15. 7.76—15.11.76	Kwang Loo i	...	3122	3216
2nd	...	19.11.76—14. 2.77	Red Plum Zao	...	2709	3041
3rd	...	17. 2.77— 8. 6.77	TN 1	...	2763	3086
Total yield for 3 crops					8594	9343

The overall paddy yield was around 3 metric tons per arpent per crop. Hence, potentially a total yield of 9 metric tons paddy could be obtained from one arpent of land when adopting three rice croppings per annum.

7.26.13. *Rice stem borer control experiment*

Design : Randomised complete block with 3 replications

Treatments : A—Blank (control)

B—Spraying mixture of 2.5 gm. Sevin 50% W.P. + 1 c.c.
Nuvacron 50% E.C./litre of water

C—Broadcasting dipterex granules 2.5% G at 4 gm/m²

D—Broadcasting furadan granules 10% G at 1 gm/m²

Plot size : 36.36 m² (7.20 m × 5.05 m)

The small plots were bordered to prevent interaction of the insecticides and the blocks were surrounded with protection rows.

Rice variety: TN1

Insecticides were employed on 31st March and 6th April 1977. Results are presented in table 7.25.8 below.

TABLE 7.25.8

MEAN PADDY YIELD KG/PLOT

<i>Treatment</i>			<i>Kg</i>	<i>difference</i>		
D	...	...	21.80	—	—	—
C	...	...	18.30	3.50*	—	—
B	...	...	18.20	3.60*	0.10	—
A	...	...	17.30	4.50*	1.00	0.90

Statistical analysis showed significant differences in paddy yield existed among the treatments. Treatment D gave the highest paddy yield and was significantly higher than either C, B or A.

7.26.14. *Citrus*

The Eureka Frost lemon trees grew very fast, both the plant height and the tree crowns exceeded two metres. The plants flowered in April/May and set fruits afterwards, averaging more than 130 units per plant. The plants of Golden Seal, Valencia Late, and tangelo varieties were also growing very satisfactorily. Their tree crowns exceeded 1.5 metres in diameter. However, orange trees of the Jaffa variety were not growing well, the branches were short and weak. The tree crown was small and low.

7.26.15. *Bitter gourd*

Two varieties of bitter gourd Gaileung and Kwangmoon were put under observation. The former variety yielded 10.6 tons per arpent whereas the latter variety yielded 6.4 tons per arpent.

7.26.16 *Sponge gourd*

Area under sponge gourd cultivation was 0.017 arpent and was mainly for seed production.

7.26.17. *Straw mushroom*

Four batches of rice straw mushroom were cultivated indoor during period reported and results are presented in table below:

TABLE 7.25.9

YIELD OF FRESH MUSHROOM

Batch	Date	Mean temperature outdoor 1	Mean R.H.% outdoor 2	%water content in heap 3	Spawn quality	kg mushroom per 100 kg straw
I	... 5.1.77-4.2.77	27°C	79	about 75	strong vitality	9.2
II	... 7.2.77-24.3.77	26.4°C	79.5	about 75	strong vitality	19.1
III	... 25.3.77-28.4.77	25.3°C	82.2	about 80	weak vitality	6.0
IV	... 2.6.77-13.7.77	21.9°C	81.2	about 75	moderate vitality	10.6

1 The indoor mean temperature was 1°-3°C higher

2 The indoor mean relative humidity was 2%-3% higher

3 Approximate values

7.27 *Report for period covering July to December 1977*

7.27.1 Total area under rice cultivation was 5.7 arpents giving a total yield of 23.91 metric tons of paddy, averaging to 4.19 metric tons paddy per arpent. There were 4.02 arpents devoted to production and the average paddy yield was 4.73 metric tons per arpent.

Variety	Area arpent	Average yield Tons/arpent	Total Tons/arpent
Ko Hsuan 17	... 0.31	5.70	1.77
Kwang Er i 5-3	... 2.94	4.84	14.23
TN 1	... 0.46	4.07	1.87
Chen Chu i no. 11	... 0.31	3.75	1.16
TOTAL	... 4.02	4.73	19.03

7.27.2. *Variety trial A*

Design, plot size and spacing same as 7.25.2.

Fertilisation : 9,000 kg. cow manure+900 kg. chicken manure+32 kg. ammonium sulphate+32kg. muriate of potash +63 kg. single superphosphate applied to the arpen as basal dressings.

At tillering stage, a mixture of 124 kg. ammonium sulphate and 100 kg. single superphosphate and at panicle initiation stage, 55kg. of ammonium sulphate were applied to the arpent.

TABLE 7.25.10

MEAN PADDY YIELD KG/15m²

Variety	Kg	difference					
Red Plum Zao ...	12.97	—	—	—	—	—	—
Kwang Loo i no. 4 (CK) ...	12.00	0.97*	—	—	—	—	—
Kwang Chiet Chew ...	11.78	1.19‡	0.22	—	—	—	—
Lew Sew Chao ...	10.72	2.25‡	1.28‡	1.06‡	—	—	—
Chin Ziap Chin ...	10.58	2.39‡	1.42‡	1.21‡	0.14	—	—
Er Chu Chin ...	9.97	3.00‡	2.03‡	1.81‡	0.75*	0.61	—

L.S.D. 5% 0.72

1% 0.98

Mean yields differed significantly among the varieties tested. Red Plum Zao was the top yield followed by Kwang Loo i no. 4 (check). The mean yield difference between them reached significance. The yield difference between Red Plum Zao and any one of the other four varieties was highly significant.

7.27.3. *Variety trial B*

Design and other details of experiment were the same as 7.26.2.

Results are tabulated below:

TABLE 7.25.11

MEAN PADDY YIELD KG/15m²

Variety	Kg	difference					
Kwang Er i 5-3 ...	16.00	—	—	—	—	—	—
TN 1 (check) ...	14.18	1.82*	—	—	—	—	—
CNS-1-2 ...	14.13	1.87*	0.05	—	—	—	—
Nanking no. 11 ...	13.60	2.40‡	0.58	0.53	—	—	—
TCS-159 ...	13.39	2.61‡	0.79	0.74	0.21	—	—
Chen Chu i no. 11 ...	13.04	2.96‡	1.14	1.09	0.56	0.35	—

L.S.D. 5% 1.44

1% 2.00

There was significant difference in mean yield among the varieties. Kwang Er i 5-3 gave the highest yield followed by the TN1 (check). The difference in yield between these two varieties was significant. Varieties Nanking no. 11, TCS-159 and Chen Chu i no. 11 gave lower yield than Kwang Er i 5-3 and reached 1% significance.

7.27.4. *Variety trial C*

Details of experiment were the same as 7.26.2, except there were two replications and ten treatments. The control variety was TN1. Results are tabulated as below:

TABLE 7.25.12

PADDY YIELD

Block varieties		Yield kg/15m ²				kg per arpent
		I	II	Total	Mean	
TCS-156	...	14.90	14.00	28.90	14.45	4066.2
TN 1 (CK)	...	14.16	13.90	28.06	14.03	3948.0
TCS-153	...	12.70	13.50	26.20	13.10	3686.3
IR 579-0142	...	13.00	12.08	25.80	12.90	3630.1
IR 532-E 68	...	13.38	12.20	25.58	12.79	3599.1
IR 22	...	12.40	12.50	24.90	12.45	3503.4
IR 20	...	11.90	12.36	24.26	12.13	3413.4
IR 352-420	...	11.90	11.50	23.40	11.70	3292.4
IR 532-208-1	...	11.10	12.20	23.30	11.65	3278.3
IR 665-6292-2	...	9.80	10.82	20.62	10.31	2901.2

TN1 (check) gave slightly lower yield than TCS-156 but higher than the rest of other eight varieties.

7.27.5. *Split application of ammonium sulphate experiment*

Details of experiment were the same as in 7.25.7.

RESULTS

TABLE 7.25.13

MEAN PADDY YIELD

Treatment		kg/12.25 m ²	difference		
A	...	11.66	—	—	—
B	...	11.35	0.31	—	—
C	...	10.70	0.96*	0.65	—
D	...	10.65	1.01‡	0.70	0.05

L.S.D. 5% 0.68

1% 0.98

Yield differences among treatments were significant. The yield difference between A and D was highly significant whereas that between A and C was only significant. However, there was no significant difference between A and B.

7.27.6 *Organic manure experiment*

Details of experiment were the same as in 7.25.8.

TABLE 7.25.14

MEAN PADDY YIELD

Treatment		kg/12.25 m ²	difference		
A	...	10.07	—	—	—
B	...	9.70	0.37	—	—
C	...	11.56	1.49‡	1.86‡	—
D	...	10.57	0.50*	0.87‡	0.99‡

L.S.D. 5% 0.38

1% 0.55

There was significant difference between the treatments. Treatments C gave higher yield than either A or B and reached 1% significance. The mean yield difference between C and D was significant. From observation, seedlings in treatment C established quickly after transplanted and tillering occurred earlier. Consequently there were more effective panicles and the yield was high. Conversely, treatment A and B had their seedlings established slowly after transplanted and tillering took place rather lately resulting in lower number of tillers.

7.27.7. *Rice variety trial in 1st year ratoon sugarcane*

Design	...	...	Randomized complete block with four replications
Treatments	...	...	Red Plum Zao (CK), Kwang Loo i No. 4, Kwang Chiet Chew, Chen Chu i No.11, Er Chu Chin, Lew Sew Chao.
Plot size	...	...	25.4 m ² (mixed stand)
Sugarcane variety	...	...	S 17 (1st year ratoon)
Sugarcane spacing	...	...	4 ft × 6 ft
Seed rate (rice)	...	...	69 kg/arpent (pure stand)
Rice spacing	...	...	6 rows of rice 20 cm apart per 6 ft sugarcane interrow.

Field management was the same as experiment 7.25.9.

TABLE 7.25.15

MEAN PADDY YIELD (MIXED STAND)							
Variety		kg/plot	difference				
Kwang Chiet Chew		4.34	—	—	—	—	
Red Plum Zao	...	3.61	0.73	—	—	—	
Er Chu Chin	...	3.20	1.14‡	0.41	—	—	
Kwang Loo i. no. 4		3.19	1.15‡	0.42	0.01	—	
Lew Sew Chao	...	2.57	1.77‡	1.04*	0.63	0.62	
L.S.D.	5%	0.78					
	1%	1.13					

The varieties Er Chu Chin, Kwang Loo i no. 4 and Lew Sew Chao each gave lower yield than Kwang Chiet Chew and difference in yield was highly significant. Though Kwang Chiet Chew gave higher yield than Red Plum Zao (CK), the difference in yield failed to reach significance.

7.27.8 *Rice seed rate trial in 1st year ratoon sugarcane interrows*

Design	...	...	randomised complete block with 4 replications
Treatments	...	...	(A) 47 kg, (B) 57 kg, (C) 67 kg and (D) 76 kg rice seeds per arpent
Plot size	...	...	22.86 m ² (mixed stand)
Sugarcane variety	...	...	M 13/56
Sugarcane spacing	...	...	5 ft. × 5 ft.
Rice variety	...	...	Red Plums Zao
Rice spacing	...	...	4 rows of rice at 20 cm. apart

Percentage of sugarcane land under rice was 52.5%.

Field management was the same as experiment in 7.25.11 with the exception that 9.5 tons of cow manure were applied to the arpent (pure stand) for covering the rice seeds.

Results are tabulated below:

TABLE 7.25.16

MEAN PADDY YIELD (MIXED STAND)

Treatment		kg/plot	difference		
D	...	4.83	—	—	—
C	...	4.28	0.55	—	—
A	...	4.15	0.68	0.13	—
B	...	3.48	1.35†	0.80	0.67

L.S.D. 5% 0.83

1% 1.19

There was significant difference in mean yield among the treatments. Treatment B gave lower yield than D and was highly significant. The number of effective panicles increased with the increase of seed rate, conversely, the panicle rate, number of tillers per seedling and the number of grains per panicle decreased with the increase of seed rate.

7.27.9. *Optimum number of rice rows in 7ft sugar interrows*

Design	...	...	randomised complete block with 4 replications
Treatments	...	...	(A) 4 rows, (B) 5 rows, (C) 6 rows and (D) 7 rows. The rows were 20 cm apart.
Plot size	...	...	17.78 m ² (mixed stand)
Sugarcane varieties	...	...	S 17 and M 13/56 (2nd year ratoon)
Rice varieties	...	...	Red Plum Zao

Field management was the same as experiment 7.25.9.

Results are presented in table 7.25.17.

TABLE 7.25.17
MEAN PADDY YIELD (MIXED STAND)

Treatment	Kg/plot	difference			
6 rows	... 3.39	—	—	—	
5 rows	... 3.17	0.22	—	—	
7 rows	... 2.96	0.43	0.21		
4 rows	... 1.91	1.48†	1.26*	1.05*	
L.S.D. 5%	0.95				
1%	1.36				

From statistical results, there was significant difference in mean yields among the treatments. Treatment A gave lower yield than C and was highly significant. Both B and D gave significantly higher yield than A.

7.27.10 Three rice croppings per annum trial

This was the first cropping of the second trial started on 19th July 1977. Two fields block IV—fields 5 and 6 totalising to 0.30 arpent were selected for the trial.

TABLE 7.25.18
PADDY YIELD

Field	Transplanting to harvest	Variety	Area arpent	Kg per arpent
5	... 19.7.77 — 28.11.77	Red Plum Zao	... 0.14	3645
6	... 19.7.77 — 16.11.77	Kwang Loo i no. 4	... 0.07	3577
6	... 19.7.77 — 1.12.77	Chen Chu i no. 11	... 0.08	3707

The mean paddy yield was 3.48 tons per arpent. The variety Chen Chu i no. 11 gave slightly higher yield than the other 2 varieties but its growth cycle was also longer.

7.27.11. Rice stem borer control experiment

Design and other details of experiment were the same as 7.25.13 with the exception that Dipterex was replaced by 'Miral'. The 'Miral' 10% G granule was applied at 1 gm/m². The experiment was conducted in Block I field 5.

Results are presented in table 7.25.19.

TABLE 7.25.19
MEAN PADDY YIELD/PLOT

Treatment	Kg	difference			
D	... 36.10	—	—	—	
C	... 33.50	2.60*	—	—	
B	... 31.70	4.40†	1.80	—	
A	... 30.30	5.80†	3.20*	1.40	

Treatment D gave higher yield than either B or A and difference in yield was highly significant. From investigation, samples from C and D did not show sign of borer attack. However, there was significant difference in yield between them. Apart from controlling the rice stem borer effectively, furadan probably had a better control of other pest such as rice skipper and straw fly.

7.27.12. *Sweet potato variety trial*

Design ...	...	...	randomised complete block with three replications.
Treatments ...	...	...	9 varieties of sweet potato were compared with variety SM 4 as check.
Plot size ...	...	...	18.7 m ² (1.2 m × 15.6 m)
Mound ...	...	...	30 cm high
Spacing ...	...	...	120 cm × 26 cm
Cuttings ...	...	...	61 per mound
Fertilizer ...	...	...	9,000 kg cow manure + 900 kg chicken manure per arpent as basal dressings
			133 kg ammonium sulphate + 63 kg single super-phosphate + 32 kg muriate of potash as top dressings

Result are presented in table 7.25.20.

TABLE 7.25.20

		MEAN YIELD/PLOT (FRESH MATTER)									
Variety		Kg	difference								
SM 4	...	94.8	—	—	—	—	—	—	—	—	—
Kwang Tung 16	...	91.8	3.0	—	—	—	—	—	—	—	—
Yue 709	...	90.7	4.1	1.1	—	—	—	—	—	—	—
Chow Nung 69-219	...	90.3	4.5	1.5	0.4	—	—	—	—	—	—
Little leaf	...	84.4	10.4*	7.4	6.3	5.9	—	—	—	—	—
Leek	...	81.7	13.1*	10.1*	9.0	8.6	2.7	—	—	—	—
Peking	...	77.7	17.1*	14.1*	13.0*	12.6*	6.7	0.4	—	—	—
Chain 64-285	...	71.7	23.1†	19.0†	18.6†	18.6†	12.7*	10.0*	6.0	—	—
Chestnut	...	45.0	49.8†	46.8†	45.7†	45.3†	39.4†	36.7†	32.7†	26.7†	—
L.S.D.	5%	9.8									
	1%	13.4									

The yield differences among varieties were highly significant. The yield differences between SM4, Kwang Tung 16, Yue 709 and Chow Nung 69-219 were insignificant. All the remaining varieties gave significantly lower yield than SM 4. In term of dry matter, these varieties Leek, Little leaf and Chain 64-285 gave higher yield than SM 4.

7.27.13. *Citrus*

The Eureka Frost lemon trees grew quite rapidly and 327 lemons were collected from the two trees during November and December. The Golden Seal and Valencia Late orange trees were also growing satisfactorily. These trees flowered profusely in August and plenty of fruits was set. The average number of fruits was 120 units per tree. However, the Jaffa orange trees were not growing well and eight diseased plants were uprooted and replaced by Golden Seal orange trees.

7.27.14. *Bitter gourd*

Three varieties of bitter gourd Gaileung, Kwangmoon and Seuheng were put under observation and their respective yield was 16.8 tons, 15.7 tons and 13.3 tons per arpent. The variety Gaileung looks very promising.

7.27.15. *Sponge gourd*

Area under sponge gourd cultivation was 0.05 arpent. A total of 1.003 kg. of fresh fruit were collected equivalent to 18.6 tons per arpent. In addition, 7.5 kg. of dry seeds were collected.

7.27.16. *Straw mushroom*

Two batches of rice straw mushroom were cultivated under outdoor conditions and results are tabulated below.

TABLE 7.25.21—YIELD OF FRESH MUSHROOM

Batch	Date	Mean temperature	Mean Minimum temperature	Mean R.H. %	kg fresh mushroom per 100 kg dry straw
I ...	28.6.77 — 7.8.77 ...	21.2°C	17.1°C	80	7.5*
II ...	24.8.77 — 12.10.77	22.0°C	17.4°C	77	11.9

7.28. *Staff Movement*

7.28.1 Scientific Officer O. Bissonauth and Technical Officer G. S. Mocude were transferred to Extension Division and Crop Experiment Stations Division respectively. Technical Officer D. Bundhoo and Scientific Officer H. Rojoa went on study leave. Scientific Officer N. Govinden was appointed Officer in charge of Land Use Division.

VIII. Plant Pathology Division

HEAD OF DIVISION: G. M. LALLMAHOMED, DIVISIONAL
SCIENTIFIC OFFICER

8.1 The Plant Pathology Division is responsible for the prevention and control of plant diseases. Foreign plant diseases and pests are prevented from entering into the country through strict phytosanitary control being exercised at the harbour and airport. Research investigations were mainly carried out on bacterial wilt strain variation, ginger blight control and the identification and characterization of tobacco and chilly virus diseases. Seed pathology studies were newly initiated in the division. Important crop introductions were also assessed for resistance to main diseases.

*There was ant damage.

8.2. *Research Investigations*

8.2.1. *Bacterial Wilt (Pseudomonas solanacearum) strain variation*

G. M. LALLMAHOMED, N. YERIGADOO AND S. SOOMARY

Aspects of research on bacterial wilt strain variation were mainly on survival, epidemiology and temperature relations.

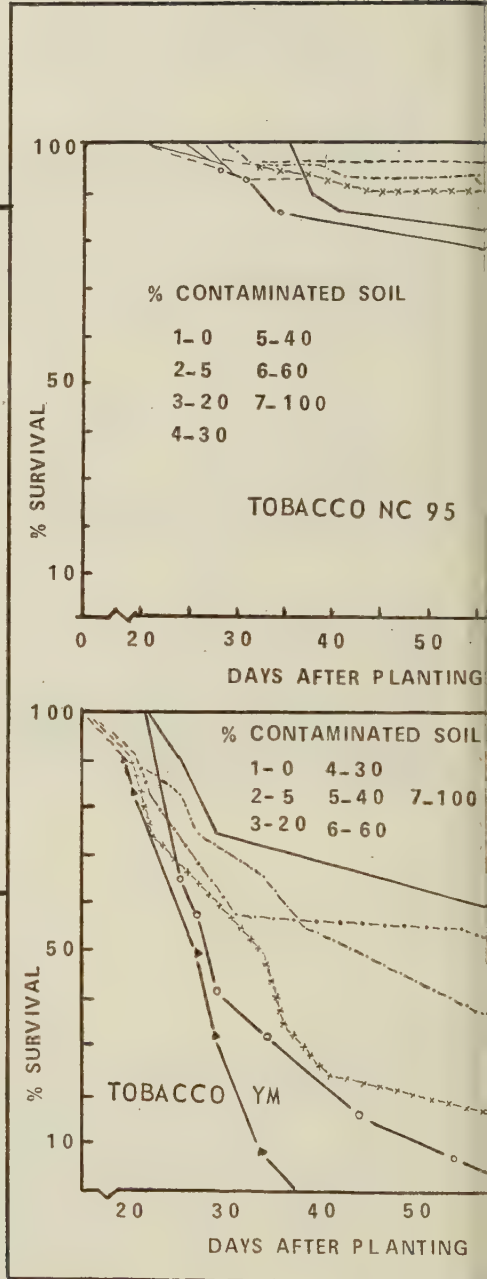
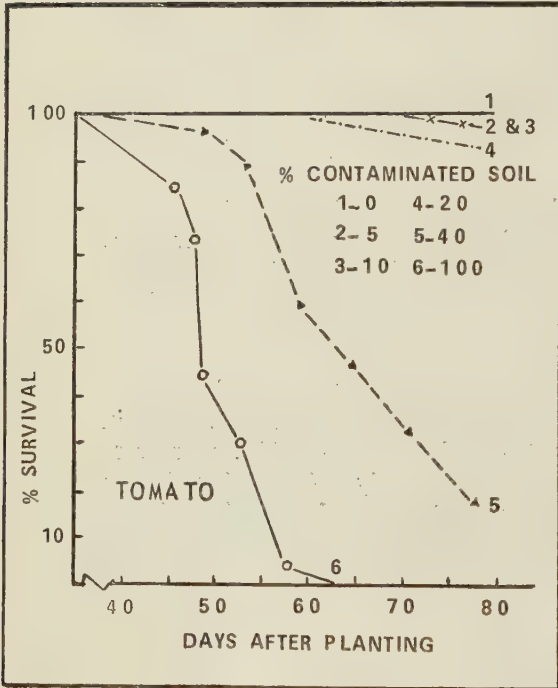
Survival of the two races of the bacterial wilt organism (Races 1 and 3) in potato tubers kept at 4° and 20°C indicated that there were no differences in survival rate at 20°C. At 4°C, the bacteria became either avirulent or could not survive for more than 3 months. Similar results were obtained with pure culture suspensions kept at those temperatures. Both races however, survived during the one year period of experimentation at 20°C. Single colonies were virulent to tobacco and potato according to the race to which the colonies belonged.

In epidemiological studies, the importance of moisture and inoculum potential was specially evident. Increasing infection and mortality were obtained with increasing levels of moisture and inoculum in the tobacco varieties NC 95 (Resistant), Yellow Mammoth (susceptible) and the local susceptible tomato variety (Fig. 8.1).

Temperature relation studies carried out at 4°, 20°, 28°, 32°, 36° and 40°C revealed that the optimum temperature for growth of both races in solid or liquid media situate near 32°C (Fig. 8.2). Growth did not occur at 4°, 36° and 40°C. The bacteria could grow very slowly at 20°C, tiny discrete colonies on agar plates were visible only after 3 days and were about 1 mm in diameter after 96 hours of growth. Largest colony diameters were obtained at $32 \pm 0.5^\circ\text{C}$ (Table 8.1).

FIGURE 8.1

SURVIVAL OF TOBACCO (vars NC 95 AND YM)
AND TOMATO IN SOIL CONTAINING DIFFERENT
BACTERIAL CONCENTRATIONS



24 HOUR GROWTH

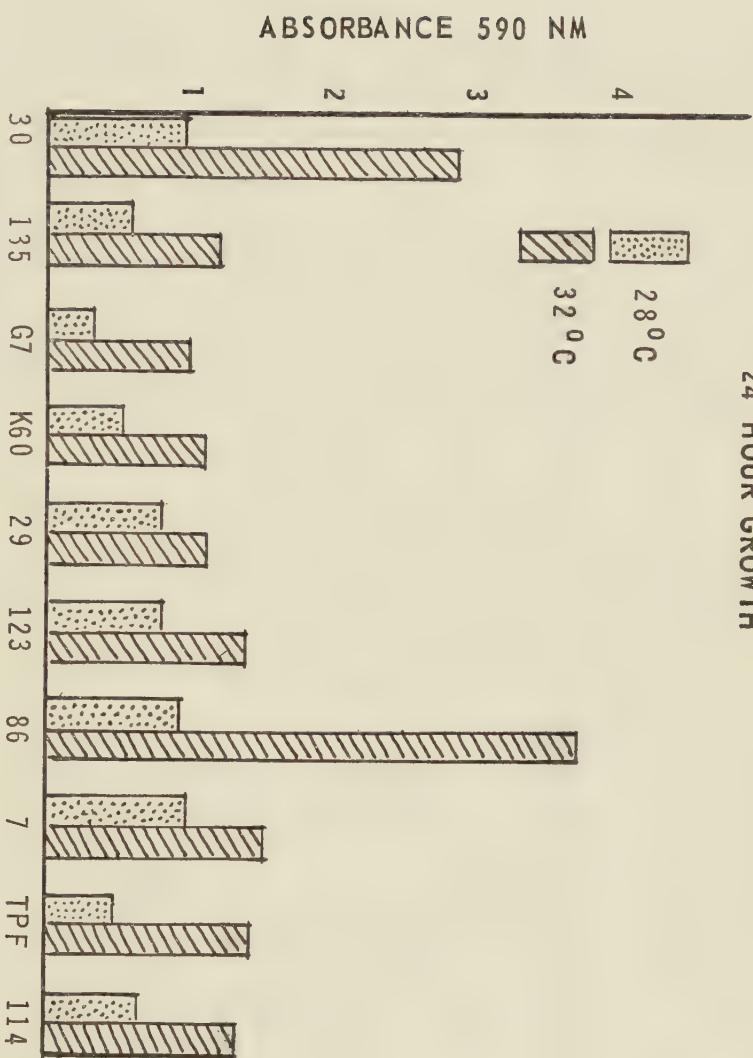


FIGURE 8.2 ISOLATES

Growth of different isolates of *P. solanacearum* in liquid at 28 and 32 for 24 hours

TABLE 8.1
NUMBER AND MEAN DIAMETER* (mm) OF COLONIES OF *P. SOLANACEARUM* GROWN ON
TETRAZOLIUM MEDIUM AT DIFFERENT TEMPERATURES

Isolate	Growth Period (Hrs)	20 ± 0.5°C			28 ± 0.5°C			32 ± 0.5°C		
		48	72	96	No. of colonies†	Mean diameter	No. of colonies†	Mean diameter	No. of colonies†	Mean diameter
29 ...	...	Trace	Trace		692	.81 ± .24	600	.83 ± .37	607	1.48 ± .40
TPF	...	Trace	Trace		946	.71 ± .34	604	.70 ± .31	621	.95 ± .39
G 7 ...	...	Trace	Trace		353	.93 ± .39	510	.29 ± .29	415	1.18 ± .41
K 60	...	Trace	Trace		974	.70 ± .20	888	.74 ± .32	1014	1.02 ± .39
										4.32 ± 1.3
										3.86 ± .75
										4.01 ± 0.5
										4.13 ± 1.1

* mean of 24 colonies

† Average of 3 replicates

8.2.2. *Seed Pathology* (J. BUCHA AND I. RAMDIN)*Report on Health Analysis of Discoloured Rice Grains Collected at Belle Vue Station*

During the course of a visit to Belle Vue Station in November 1977 a high incidence (50-60%) of discoloured rice grains was observed in the field. The cultivars involved were TN1, Kwang-Chiet-Chew and Chen-Chu-i. Discoloured rice grains selected by the Chinese Agricultural Mission were received at Redit for analysis.

Four hundred seed-sample of each cultivar was analysed by the blotter method (Neergaard and Saad, 1962)*. Seeds were sown on moist blotters in pyrex petri dishes and then incubated at about 20°C under 12 hours of alternating cycles of Near Ultra Violet (NUV) light and darkness. The seeds were examined after 8 days of incubation as recommended by International Seed Testing Association for routine seed health testing. The plates were kept under observation for a further period of 5 days and re-examined.

Results are shown in the table below:

TABLE 8.2

HEALTH ANALYSIS OF DISCOLOURED RICE GRAINS BY THE BLOTTER METHOD. 400-SEED SAMPLE PER CULTIVAR USED. INCUBATION TEMPERATURE ca. 20° C, UNDER 12-Hr. CYCLES OF NUV AND DARKNESS.

Records (%)	Rice Cultivars		
	Kwang-Chiet-Chew	TN1	Chen-Chu-i
Serious Pathogens			
<i>Trichoconis padwickii</i> ...	2	3	2
<i>Dreschlera oryzae</i> ...	1	1	0
<i>Curvularia lunata</i> ...	6	9	2
Doubtful Pathogens			
<i>Fusarium semitectum</i> ...	2	1	2
<i>Alternaria tenuis</i> ...	6	0	2
<i>Nigrospora oryzae</i> ...	0	1	0
<i>Epicoccum purpurescens</i> ...	4	1	0
Saprophytes			
<i>Cladosporium</i> spp. ...	14	2	0
<i>Penicillium</i> spp. ...	1	3	0
<i>Aspergillus</i> spp. ...	1	0	1
<i>Rhizopus</i> spp. ...	0	4	6

*Neergaard, P. and Saad, A. (1962)

Seed Health Testing of Rice: A contribution to development of laboratory routine testing methods. Indian Phytopathology, 15 : 85-111

Only discoloured grains were examined. The organisms listed in the above table can under the right environment cause grain discoloration. However the relatively low level of infection detected in the present exercise clearly indicates that the observed grain discoloration cannot be entirely attributed to the presence of these organisms. Climatic conditions especially moist weather are liable to induce rice grain discoloration.

8.2.3. *Ginger Blight Control* (M. PILLAY AND M. CHINAPPEN)

In a fungicide trial conducted at Pamplémousses Experiment Station, Dithane M45, Benlate and Topsin 'M' (Thiophanate methyl) were tested against the *Pyricularia* blight of ginger. Statistical analysis of results indicated no significant difference in yield at harvest among treatments. In a previous trial at Dubreuil in 1975, both Dithane M45 and Benlate had given significantly higher yields than the control. Poor growing conditions at Pamplémousses and very late planting might have affected the experiment.

8.2.4. *Characterization of virus diseases* (I. DOSSA, S. P. BENI MADHU AND W. M. W. KHIM CHENG)

8.2.4.1. *Tobacco*

As in past years, a survey of virus diseases of tobacco was conducted in close collaboration with the Tobacco Board. All specimens collected were brought to the laboratory for examination which was based on differential host reactions and serological techniques. The results are listed below: Veinal necrosis on *Nicotiana tabacum* var. NC 95 (from La Nouvelle Industrie Ltée) was shown to be caused by a necrotic strain of Potato virus Y. Microprecipitin tests under mineral oil conducted using potato virus Y. antiserum (ATCC PV AS 72) gave a sap titre of 1:512 and an antibody titre greater than 1:1024. Tobacco veinal necrosis giving same symptoms as above on test plants and identical results in serology were isolated from Pamplémousses, Gibraltar, Brunès-Pailles and Richeterre. No cases of mixed infections involving PVY was recorded.

A mixed infection of tobacco mosaic virus (TMV) and cucumber mosaic virus (CVM) was detected for the first time on *Nicotiana tabacum* var. NC 95 from Bois Marchand by microprecipitin test in which the sap from infected plant gave a titre of 1:512 against TMV and a titre of 1:256 against CMV antisera. Sap from a healthy plant failed to react with tobacco mosaic virus and cucumber mosaic virus antisera and with normal serum.

Weather fleck was noted at Gibraltar, Queen Victoria, Camp Ythier, Richeterre, Trou aux Biches and Reduit. Weather fleck was also noted on tobacco varieties Yellow Mammoth and NC 95 grown under greenhouse conditions.

8.2.4.2. *Chilly*

During the year, a study of viruses affecting chilly (*C. frutescens*) was started with the aim of identifying the viruses concerned. Generally, symptoms on *C. frutescens* at different locations were identical, i.e. a mottling of leaves, fruit and leaf deformation.

Leaves of infected plants were ground in phosphate buffer 0.01M pH 7.0 and identification based on the use of indicator plants and serology. The indicator plants consisted of *Chenopodium amaranticolor*, *C. quinoa*, *Datura stramonium*, *Nicotiana glutinosa*, *N. tabacum* var. Yellow Mammoth, *C. frutescens* var. Chinese Giant, *N. tabacum* var. White Burley and *Gomphrena globosa*. Serological technique was confined to microprecipitin tests under mineral oil.

A single case of severe malformation was associated with a multivirus infection, namely potato virus Y and potato virus X. In all other cases the virus involved reacted positively with PVY antiserum (ATCC PV as 72); no other viruses were recorded. It was concluded that Potato virus Y was the causal agent of the mottling disease of chilly.

8.3. *Assessment of Resistance to Main Diseases in Various Crops*

83.1. *Resistance to Tobacco Bacterial Wilt* (G. M. LALLMAHOMED, N. YERIGADOO AND D. TOURABALLY)

Three tobacco varieties, NC 95, Yellow Mammoth and C 86 were evaluated for bacterial wilt tolerance in a heavily infected plot at Pamplemousses Experiment Station from August to December 1977. Disease rating of 1-5 were converted into disease indices using the following formula:

$$\text{Disease Index} = \frac{\text{Number of plants in each symptom category} \times \text{Corresponding numerical grade} \times 100}{\text{Maximum numerical grade for the given number of plants}}$$

Results tabulated below indicate that the tobacco variety C 86 was least susceptible but did not differ significantly from variety NC 95 in its tolerance to bacterial wilt.

TABLE 8.3

RESISTANCE IN TOBACCO VARIETIES TO BACTERIAL WILT

Variety		Mean Disease Index	
NC 95	...	...	17.38 ^{b*}
Yellow Mammoth	...	...	62.27 ^a
C 86	...	...	5.13 ^b
L.S.D. 5%		...	± 3.46
			± 5.24

*Small letters indicated Duncan's multiple range groupings of treatments which do not differ significantly.

8.3.2. *Resistance to Rootknot nematodes (Meloidogyne spp.) in tobacco*

N. YERIGADOO, D. TOURABALLY AND G. M. LALLMAHOMED

Newly introduced tobacco varieties were assessed for resistance to rootknot nematodes (*Meloidogyne* spp.) in variety trials conducted by the Agronomy Division during the second tobacco season of 1976 at Richelieu Experiment Station. Rootknot nematode damage was assessed after final harvest in February 1977 when plants were uprooted and observed for the degree of root galling. Results are tabulated below:

TABLE 8.4

RESISTANCE IN TOBACCO VARIETIES TO ROOTNOT NEMATODES

Variety		Mean Disease Index	
		1st season Jan-July/ August 1976	2nd season August 1976- February 1977
NC 95	...	0.78 ^{a*}	5.37 ^a
SC 66	...	0.45 ^a	4.12 ^a
Speight 28	...	0.69 ^a	6.50 ^a
Coker 347	...	0.54 ^a	4.25 ^a
SC 72	...	0.89 ^a	7.12 ^a
Speight 33	...	2.36 ^b	23.12 ^b
SC 71	...	2.69 ^b	15.25 ^c
SC R	...	4.17 ^c	26.00 ^b
Yellow Mammoth		2.34 ^b	20.87 ^b
L.S.D .05	...	± 0.89	± 5.16
.01	...	± 1.20	± 6.99

Results indicate similar trends in rootknot nematode susceptibility during both seasons. Varieties were more susceptible to nematode during the 2nd season. Tobacco varieties Speight 33, SC 71, SCR and Yellow Mammoth were more susceptible than the other tobacco varieties.

8.3.3. *Resistance in Tobacco to Tobacco Mosaic Virus (TMV) and Potato Virus Y (PVY).*

I. DOSSA, S. P. BENI-MADHU AND W. M. W. KHIM CHENG

Eight flue-cured varieties were tested in 8 replicates. None of the varieties tested was resistant to Potato virus Y (necrotic strain). Varieties Coker 86 and SC 72 were tolerant to TMV. Identical results were obtained in two separate experiments.

*Small letters indicate Duncan's multiple range groupings of treatments which do not differ significantly.

TABLE 8.5

RESISTANCE IN TOBACCO VARIETIES TO TMV AND PVY (NECROTIC STRAIN)

<i>Varieties</i>		<i>Symptoms produced by inoculation with TMV</i>	<i>Symptoms produced by inoculation with PVY (necrotic strain)</i>
Coker 86 ...	...	Local lesions	Veinal necrosis
Yellow Mammoth ...	...	Mosaic	Veinal necrosis
NC 95 ...	...	Mosaic	Veinal necrosis
Coker 347 ...	...	Mosaic	Veinal necrosis
Speight — G 28 ...	...	Mosaic	Veinal necrosis
SCR ...	...	Mosaic	Veinal necrosis
Speight — G 33 ...	...	Mosaic	Veinal necrosis
SC 72 ...	...	Local lesions	Veinal necrosis

8.4. Occurrence of Diseases

8.4.1. Coconut Palms (*Cocos nucifera*)

A disease outbreak in a well-maintained four-year old plantation at Poudre d'Or was investigated in May. The disease was characterized by a necrosis and rot of leaflets and petiole of the emerging leaf; the condition extending fairly deep inside the crown. Fully emerged leaves were deprived of leaflets along most of their length. A *Fusarium* sp. was found associated with that condition. The disease was controlled by Benlate ($\frac{1}{2}$ g/litre) spray at weekly intervals.

8.4.2. Anthuriums (*Anthurium andreanum*)

(a) A leaf blotch quite similar to the common Anthracnose (*Glomerella cingulata*) was investigated in March. Perithecia of a *Guignardia* sp were found on the lesions of diseased leaves submitted to the Division. The fungus could not be obtained in culture. However, when pieces of diseased leaf tissue were pressed against healthy detached leaves by moist sterilised cotton-wool and 'sellotape' for three days, symptoms similar to those on the original leaves developed in about a week.

(b) Leaf spots caused by *Phyllosticta* sp, *Pestalotiopsis breviseta* and *Glomerella cingulata* were of common occurrence particularly in younger plantations.

(c) Isolated cases of bacterial wilt (*Pseudomonas solanacearum*) were noted in most of the major *Anthurium* nurseries during active growth inspection carried out by the Division.

8.4.3. Groundnut (*Arachis hypogea*)

Rust (*Puccinia arachidis*), was again severe throughout the island.

This disease was recorded for the first time in Rodrigues in November.

8.4.4. *Lettuce (Lactuca sativa)*

Var. 'Sucrene' was found severely affected by grey mould *Botrytis cinerea* at Curepipe Experiment Station.

Several cases of wilt, caused by *Sclerotinia sclerotiorum* were recorded on vars. 'Sucrene' and "Mignonette" in the same locality.

8.4.5. *Herbicide Injury*

No less than twenty cases of alleged herbicide damage resulting from spray drifts were investigated. Tomato, egg-plant and lady's finger were the main crops affected.

8.5. *Plant Protection Service*

8.5.1. *Exports*

2604 Phytosanitary Certificates were issued during the year 675 of which were for commercial exports. The latter consisted mainly of cut-flowers (*Anthurium* sp.), fresh ginger and ornamental plants.

The number of export-oriented *Anthurium* nurseries was on the increase and 19 were registered with the Division by the end of the year. To facilitate certification, hence export formalities, inspection of mother plants and flowers during active growth was undertaken for those nurseries on a monthly basis.

Used gunny bags destined for exportation were fumigated with methyl bromide under tarpaulin on several occasions. The erection of a fumigation plant at Fort-George is nearing completion.

8.5.2. *Imports*

726 Plant Import Permits were issued for items ranging from vegetable and flower seeds to fresh fruit, table and seed potatoes, onion, garlic and maize.

8.5.3. *Control at Ports of Entry*

Phytosanitary control was exercised during the arrival of 2339 planes and 282 ships. 151 planes had to be de-insectized on arrival.

Out of 897 items intercepted at Plaisance Airport, only 87 could be released after examination. Two consignments of lemons and maize had to be re-shipped to their country of origin owing to non-observance of phytosanitary regulations.

19 out of 70 items detained at the Port-Louis harbour sub-office were released after presentation by importers of regular phytosanitary certificates and inspection. Animal quarantine control was exercised on behalf of the Division of Veterinary Services. 51 animal materials were detained and sent to Reduit for treatment. 664 landing permits were issued for imported frozen meat. On 5 occasions, live animals were not authorized to land and had to be diverted back by the carrier.

8.5.4. *Plant Quarantine*

Plant material released from quarantine during the year included:

1. Apple and Pea seedlings from South Africa (private importers)
2. *Strelitzia regina* from South Africa (private importers)
3. Ornamental plants from Kenya (Conservator of Forests)
4. Forest plants from Kenya (Conservator of Forests)

At the end of the year the following were still undergoing quarantine prior to release for planting on Experimental Stations:

1. Cotton ... 2 varieties from India
2. Rice ... 2 varieties from France
3. Rice ... 2 varieties from IRRI, Philippines.

8.5.5. Fees Collected

Rs 15,270 were collected as inspection and certification fees and Rs 2,040.70 as treatment and quarantine fees during the year.

8.6. *Miscellaneous*

8.6.1. *Study Leave*

Mr. G. M. Lallmahomed, Divisional Scientific Officer who was awarded a study leave to complete postgraduate research work at the University of Ibadan, Nigeria, left on 28th September 1977. Mr. J. Bucha was appointed to take charge of the Division as from that date.

Mr. J. Bucha, Scientific Officer, spent one year at the Danish Government Institute of Seed Pathology for developing countries on a Danida scholarship. He resumed duty on 20th September 1977.

8.6.2. *Comité de Collaboration Agricole*

Mr. J. Bucha attended the Sub-Committee on Plant Quarantine of the "Comité de Collaboration Agricole (Maurice—Réunion)" on 7th November 1977. The situation of the Fiji disease of sugarcane in Madagascar was discussed in relation to the crop in Mauritius and Réunion.

8.6.3. *Informal Eastern Africa Region Air Facilitation Meeting 7-11 November 1977*

Mr. J. Bucha attended the final session of the meeting held at the Meridien Hotel, Le Morne, Mauritius. A short report was submitted indicating our agreement in relation to Facilitation-Annexe 9 which deals with norms and practices designed to speed up movement at airports.

8.6.4. *Visit to Rodrigues*

Mr. M. Pillay, Scientific Officer, visited Rodrigues from 29th November to 3rd December to assess onion production and the general disease situation of crops in Rodrigues. Recommendations have been made on disease control in crops as well as on phytosanitary control at the airport and harbour.

IX. Entomology Division

HEAD OF DIVISION: M. J. L. MONTY, DIVISIONAL SCIENTIFIC OFFICER

9.1. Introduction

9.1.1 The development of sericulture did not progress as desired, due to the unavailability of land for growing mulberry. Although 256 persons registered their interests for taking up sericulture, only 41 farmers actually planted a total of 22 acres with mulberry.

Samples of silk reeled crudely on a locally built reeling machine, were sent to silk weavers in France for testing. The threads were found to be very irregular in denier, tenacity and elasticity, but otherwise brilliance, neatness and cleanliness were found to be excellent. Silk squares were woven from the samples supplied and dye tests gave normal reactions. The weavers reported that the Mauritian silk could be of the highest international grades, provided that automatic reeling machines were used for the reeling and re-reeling processes.

A reeling machine with 8 basins of 6 ends each was erected at Curepipe Experiment Station. The unit is capable of reeling silk from cocoons produced from about 50 acres of mulberry. The reeling machine does not have an automatic denier control and will be suitable for producing raw silk for handlooms.

The Sericulture Expert, Mr. N. K. Ganesh from the Indian Silk Board, spent a two-month leave in India and resumed work in May.

9.1.2 Research on the control of the Natal Fruit fly was started in August with the co-operation of Mr. Claude Hammes, an Entomologist of the "Office de la Recherche Scientifique et Technique Outre-Mer (ORSTOM)", appointed by the French Government under a bi-lateral co-operation scheme between Mauritius and France. The research programme aims at the ultimate use of suitable techniques for eradication of the pest, since neither chemicals nor the use of natural enemies can effectively be used under the local conditions of fruit production.

9.1.3. The research on the control of the stable fly *Stomoxys nigra* Macquart entered its 8th year since its original establishment in 1970. Considerable progress has been achieved in the biological control of the pest by the successful establishment of parasites introduced from Uganda. The parasites disperse well but it will be many years before they are expected to control the fly adequately. An excellent trapping method has been set up to alleviate the nuisance caused by the flies to cattle stalled in byres kept by villagers. A small herd of 15 head of cattle was successfully raised in open pastures at Curepipe throughout the year, a breakthrough in livestock production in Mauritius where until recently cattle could thrive in the open only in coastal and dry areas. This was possible through a reduction in fly densities brought about by parasites and the use of insecticides during the period November/March when flies are most abundant. The possibilities of eradication by the sterile insect technique continued to be investigated.

9.1.4. *Pesticides Control Board*

The Divisional Scientific Officer (Entomology) attended the monthly meetings of the Pesticides Control Board under the Chairmanship of the Chief Medical Officer of the Ministry of Health.

9.1.5. *Gamma Irradiator for Research*

The Division acquired a gamma-ray irradiator for its research programme on the use of the sterile insect technique for pest control. The model chosen was the Gammator M38-3 manufactured by Isomedix of the United States and supplied by Kewaunee Scientific Equipment Corporation of North Carolina, USA. The Gammator M38-3 contained 2,400 curies of Cesium 137 and delivered gamma rays at the rate of 90,000 rads per hour. The radioactive source is completely sealed in protective shields which guarantee complete safety to the users.

9.1.6. *Visitors*

The following overseas visitors were received by the Divisional Scientific Officer (Entomology) during the year:

DR MAURICE FONTAINE, Lepidopterist from Belgium;

MR D. RAVELONASY of the Malagassy Plant Protection Services;

DR MINORU UEDA AND MR TOMOAKI ANDO, from the Sumitomo Chemical Co. Ltd of Osaka, Japan;

PROFESSOR T. O. BROWNING, of the Waite Agricultural Research Institute of the University of Adelaide, Australia, and MRS BROWNING;

PROFESSOR D. S. KETTLE, Head of the Department of Entomology of the University of Queensland, Australia, and MRS KETTLE;

MR. J. GROENENDIJK, Agricultural Counsellor of the Royal Netherlands Embassy Nairobi, Kenya;

MR. R. E. TALLETT, General-Manager, Rentokil Ltd. of West Sussex, England;

MR. ANDREW M. MERCER of the International Bank for Reconstruction and Development, Washington, D.C.;

DR. MELANY, Adviser on Environmental problems from the United Kingdom;

MR. DJOENADI, Entomologist of the Indonesian Department of Agriculture;

MR. H. G. TWINE, representative of J. R. Janisch and Fruitpak (Pty) Ltd., South Africa, manufacturers of tractor mounted power sprayers;

MR. GUY SERMIER, Director, Regional CIBA-Geigy, Mozambique;

MR. E. PERRIN of S.A. Eugene Perrin & Fils, Silk Weavers of Le Grand-Lemps, France;

MR. JEAN PROVERBIO of Etablissement Proverbio, Silk dyers, Lyon, France;

MR. JEAN ARNAUD, of Arnaud and Savy, Silk printers, France;

9.2. *Stable fly Research*9.2.1. *Chemical control*

RESPONSIBLE OFFICER: J. MONTY, ASSISTED BY SCIENTIFIC OFFICER
I. BALLUCK and TECHNICAL OFFICER S. DUNHAWOOR.

(a) Insecticide trial on cattle in pasture

A herd of 15 young bulls (7-8 months) of the Creole breed were kept in open pastures at the Experimental Station of La Brasserie, Curepipe, from 18 October 1976. The calves were allowed to graze in the pastures from 7 a.m. to 6 p.m. everyday and spent the night in a stable where they were fed concentrates at the end of the day. The animals were weighed individually every month. Whenever the number of flies counted on the animals increased above 200 per animal, the calves were sprayed with a 0.1% Ciodrin (Crotoxophos) solution at the rate of 1 litre per animal delivered from a power atomiser. The treatments were made in the morning, before the herd was released in the pastures. To determine number of flies per animal, two of the animals were stalled and a total count of flies on each animal was taken twice per week between 10 and 11 a.m. The weights of the animals, fly counts and treatments are given in Table 9.1.

TABLE 9.1

AVERAGE LIVE WEIGHTS OF A HERD OF 15 YOUNG BULLS GRAZING
ON A PASTURE AT CUREPIPE, STABLE FLY COUNTS PER ANIMAL AND
FREQUENCY OF TREATMENT WITH CIODRIN INSECTICIDE —
OCTOBER 1976—NOVEMBER 1977

<i>Date of weighing</i>	<i>Average live-weight per bull in kg.</i>	<i>Average gain in weight & No. of days kg.</i>	<i>Daily weight gain/animal (gm)</i>	<i>Maximum No. of flies per animal during period</i>	<i>No. of Ciodrin treatment in period between weight</i>
First batch of 15 bulls put in pasture on 20.9.76					
18. 9.76 ...	110.256	—	—	10	—
26.10.76 ...	118.800	8.344(38)	224.8	187	—
26.11.76 ...	136.866	18.066(31)	582.8	427	—
27.12.76 ...	156.400	19.534(31)	630.1	36	8
27. 1.77 ...	170.066	13.666(31)	440.8	65	9
1. 3.77 ...	181.333	11.267(33)	341.4	66	8
2. 4.77 ...	194.333	13.000(32)	406.2	97	—
27. 4.77 ...	204.933	10.600(25)	424.0	97	—
27. 5.77 ...	216.933	12.000(32)	375.0	141	—
25. 6.77 ...	276.266	9.333(29)	321.8	50	—
27. 7.77 ...	238.866	12.600(32)	393.7	42	—
28. 8.77 ...	244.800	5.934(32)	185.4	49	—
Second batch of 14 bulls put in pasture on 31.8.77					
31. 8.77 ...	99.923	—	—	—	—
1.10.77 ...	112.714	12.791(31)	412.6	61	—
2.11.77 ...	123.928	11.214(32)	350.4	132	4
5.12.77 ...	136.140	12.212(27)	452.4	123	2

The trial is still in progress with a second batch of 14 young bulls. The first batch was sold to butchers on 28th August 1977. The animals gained weight normally, taking into consideration (a) the breed unadapted for pasture grazing; (b) the poor pasture land and (c) the absence of adequate farm management, a condition deliberately introduced, to simulate livestock production by small farmers.

Although the climatic conditions were favourable for high stable fly intensities, the animals performed well, being adequately protected during the months of December 1976 to March 1977 by the bi-weekly sprayings with Ciodrin.

(b) Fogging trials in deer park

Control of stable flies, *S. nigra*, was tried in deer parks at Union Ducray and Le Val estates, using a fogging machine. The insecticides used were Lindane, Pyrethrins and Dichlorvos at concentrations of 1.5, 2.5 and 0.5% respectively, diluted in diesel oil. The fogging machine was a portable Swing fog. SN7, delivering a thick thermal fog at the rate of 40 ml. of fogging solution per minute. At Union Ducray in a small park of 10 acres with 90 stags, the fog was delivered around the resting places of the deer, the operator carrying the Swing fog on his shoulder. Bi-weekly applications of 5 litres of solution were made from December 1976 to March 1977, in the late afternoons to avoid strong drifts by wind. Under the prevailing conditions, assessment of results was a very difficult task, especially because no fly counts can be made on such a wild animal as the stag. The treatments were judged efficient on the following observations: (i) the deer was not restless and grazed peacefully, (ii) flies immobilized in cages exposed to the drifting fog were quickly killed (iii) the area became rapidly free of flies after the fogging.

At Le Val, the deer park occupies a huge area of forested land on steep hills. The technique used to disperse the fog consisted in mounting the swing fog at the rear of a Land Rover and releasing the fog whilst the vehicle was driven at a speed of 5 to 10 miles per hour, along the paths of the park. The large numbers of stable flies which followed the vehicle moving in the parks were thus killed by the drifting fogs. However, the trials were abandoned because the area to be treated was too large and required a much bigger fogging machine than the Swing fog SN7.

(c) Laboratory testing of Dimilin

Dimilin is a synthetic insect growth regulator manufactured and supplied by Messrs Philips-Duphar of Holland. The compound is not an insecticide per se, but interferes with the formation of chitin. Insects exposed to Dimilin suffer profound physiological disturbances during metamorphosis and fail to complete their life cycles. The stable fly *S. nigra* was treated with Dimilin in two series of laboratory tests.

(i) *Topical application*

One-day old stable flies were treated with 0.5 and 0.25% solution of Dimilin in analar methanol at the rate of 1 microlitre per fly. The treated insects were mated in cages in 4 different crosses as follows:

Cross I: Treated males x untreated females

Cross II: Untreated males x treated females

Cross III: Untreated males x untreated females (control)

Cross IV: Treated males x treated females

Observations were made on mortality, fecundity, egg hatch and pupal yield (expressed as number of pupae obtained per cent eggs placed in rearing medium). The first results obtained suggest the following conclusions:

(a) Dimilin at the concentrations tested, had no killing effects on adult *S. nigra*.

(b) The fecundity of females was not affected by the treatments.

(c) The fertility of eggs laid by treated females was reduced but not completely inhibited.

(d) The pupal yield in crosses I, II and IV was extremely reduced, compared to that of the control (Cross III).

Dimilin thus possesses a delayed action expressed during larval development. The compound affects the progeny of treated females, as well as that of normal females mated to treated males. Since male *S. nigra* can inseminate at least 5 females, Dimilin may play an important role in reducing the fertility of stable flies in the environment, if the compound could be effectively applied in the field.

(ii) *Surface treatments*

The practical use of Dimilin will depend on its action on stable flies when applied to surfaces where the insects rest or feed. In preliminary laboratory tests, the upper surface of insect cages of 1 cu. ft. capacity, lined with nylon fly-mesh was dipped in a 1% suspension of Dimilin in water. *S. nigra* males and females (200 insects per cage) were released in the cages and fed on citrated blood soaked into cotton pads placed on top of the cage. The flies were thus in contact with the treated surface during feeding and otherwise rested on the other (untreated) sides of the cage. Eggs were collected on oviposition pads placed under the cage and were reared to the pupal stage in appropriate larval media.

Observations were made for pupal yield only, as the previous tests by topical application had shown that egg hatch is not a reliable method to estimate the action of Dimilin. The results obtained in two replicates were highly encouraging: the pupal yield was 0.7% in treated cages and 50% in control cages.

Dimilin possesses characteristics which may help to solve the stable fly problem by reducing the natural density of the pest to levels where the release of radio-sterilized flies may effect eradication. Tests will be conducted next year to determine the action of the compound under field conditions.

9.2.2. *Physical control by traps*—(J. MONTY ASSISTED BY TECHNICAL OFFICER Mr. S. ABEELUCK)

Introduction

During the studies conducted in 1976 with the assistance of late Dr. K. R. P. Singh, FAO Entomologist, a trap was designed to capture stable flies from cow byres. The design of the trap arose from the extraordinary positive photo-tropism exhibited by *S. nigra*. Preliminary trials in 1976 had showed that large quantities of flies could be captured daily.

In September 1977, the studies were resumed, due to the hospitality of some cow-owners in the regions of Montagne Blanche and Quartier Militaire. These regions were chosen because of the high fly densities generally prevailing on the wet central plateau. Because of labour and transport problems, only ten traps could be placed.

MATERIALS AND METHODS

(a) *The funnel trap (Fig. 9.1)*

The trap is a cage made of G.I. wire of 6 mm. diameter and lined with nylon fly mesh. It measures 30×30×30 cm. On one side, a funnel leads inside the cage, the entrance hole being of a diameter of 2.5 cm. On the side opposite to the funnel, a zip-fastener is sewed along two edges to enable an easy removal of flies.

(b) *Types of byres*

Traditional straw hut (Fig 9.2)

This hut is made of poles buried directly into the soil. Sugarcane thrash is tied in bundles and laid on the top and sides, being supported by bamboo strips tied to the poles. There is only one small entrance generally closed by a corrugated iron sheet or by a gunny sheet. The cow is tied by a rope to a pole. The urine seeps away to the manure pit outside. Litter is removed everyday. The inside of the byre is quite dark. One of these huts was chosen for the studies at Vuillemin, Quartier Militaire.

Brick-walled byre (Fig 9.3)

The modern trend is to build brick-walled byres covered with a tin roof. The size of the byre is not greater than that of a straw hut and the byre is designed to house 1—2 cows. There is only one entrance closed by a door. The inside is also dark, but the temperature and ventilation are not as good as in the straw hut. One of these byres was chosen at Providence.

Iron sheet byres

Old, discarded corrugated iron sheets or sheets from empty tar drums are very popular for the erection of cow byres. In the region chosen for the study, most of the byres were made of wooden poles, lined with such sheets. Five to seven byres were chosen at Montagne blanche, Melrose and Vuillemin (Quartier Militaire).

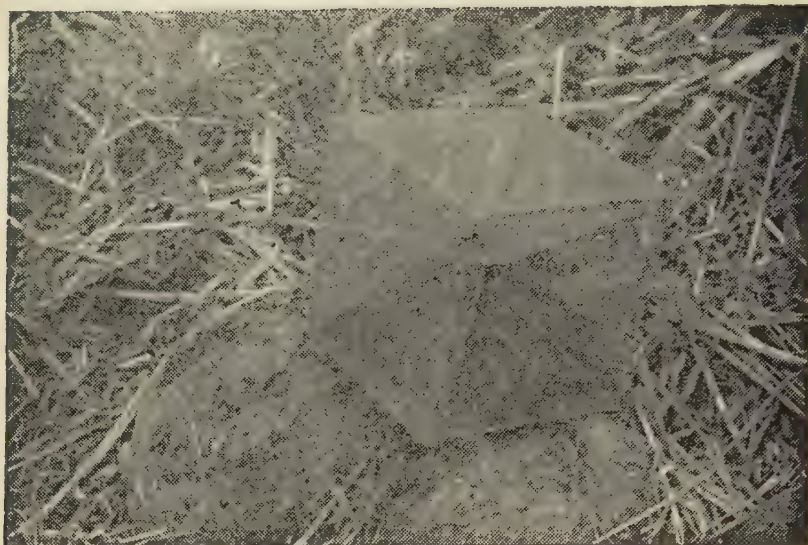


Fig.^o1. Funnel trap with captured stable flies.



Fig.^o2. A typical straw cow-byre with funnel trap.

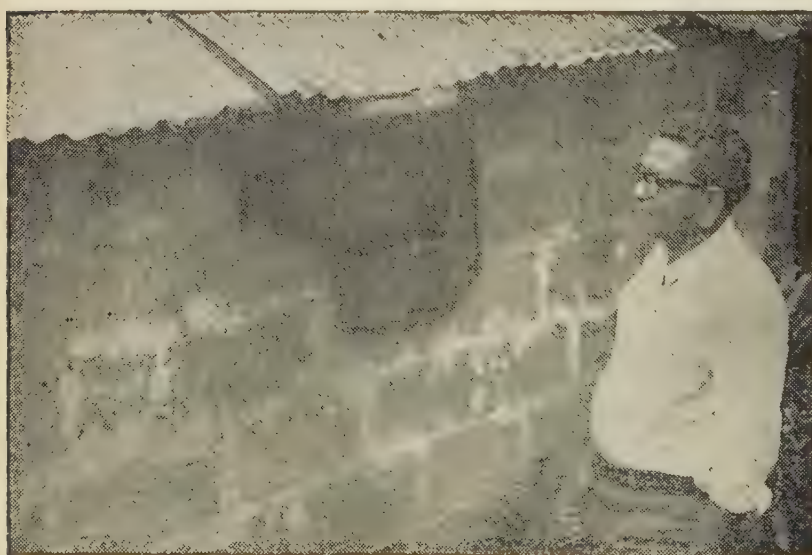


Fig.^o3. A cow-byre made of brick wall and with a corrugated iron roof.

(c) Setting the trap

The trap is placed in the most illuminated side of the cow byre, the funnel facing the interior. The trap must be placed out of reach of stray poultry which damage the mesh through eagerness to feed on the flies. The greater bulk of the trap should project well away from the wall in order to obtain maximum illumination of the trap (Fig. 9.3). It is better to place the trap in a wall facing the afternoon sun, as the heat is enough to kill the trapped flies. Care is taken to seal the space between the trap and the wall. Also, the trap must be the only illuminated spot in the dark byre.

(d) Removal of flies

The traps were placed and removed every Monday, Wednesday and Friday, except on public holidays when the operations were done on the following day. The trap with flies was removed and replaced by a clean one. The removed trap was returned to the laboratory for evaluation.

(e) Evaluation of captures

The following measures were made on each trap:

- (i) The total weight of the flies caught;
- (ii) The weight of samples of 100 flies;
(i) and (ii) give an estimate of the number of flies caught.
- (iii) The species composition based on samples of 100 flies;
- (iv) The sex ratio in samples of *S. nigra*;
- (v) The nutritive state of the flies: fed or unfed as determined by the presence of blood by a simple squash test.

RESULTS

Results are summarised in the tables 9.2, 9.3, 9.4 and Fig 9.4 and 9.5.

TABLE 9.2

NUMBER OF STABLES FLIES CAUGHT WEEKLY IN FUNNEL TRAPS
PLACED IN COW BYRES IN MOKA DISTRICT FOR THE PERIOD
SEPTEMBER — NOVEMBER 1977

<i>Week ending</i>		<i>No. of traps placed</i>	<i>No. of flies caught</i>	<i>No. of flies per week per trap</i>
12. 9.77	...	7	68,543	9791.8
19. 9.77	...	7	84,671	12095.8
26. 9.77	...	7	75,760	10882.8
3.10.77	...	7	105,090	15012.8
10.10.77	...	7	125,312	17901.7
17.10.77	...	9	209,875	23319.4
24.10.77	...	9	329,807	36645.2
31.10.77	...	9	233,421	25935.7
7.11.77	...	9	272,292	30254.7
14.11.77	...	9	204,793	22754.8
21.11.77	...	10	128,585	12858.5
28.11.77	...	9	46,571	5174.6

Total for 85 days=1,884,720 flies

Average No. of flies per trap per day=2,771.6

No. of animals in byres=17

TABLE 9.3

SPECIES COMPOSITION, SEX RATIOS AND NUTRITIVE STATE OF
STABLE FLIES CAUGHT IN FUNNEL TRAPS — BASED ON 23 SAMPLES
OF FLIES COLLECTED DURING PERIOD
5 SEPTEMBER TO 31 OCTOBER 1977

Locality (one trap per byre)	<i>Stomoxys nigra</i> % flies caught				<i>S. calcitrans</i>
	Males	Females	Total	Nutritive state: % flies fed	% flight caught
Montagen Blanche ...	39.5	59.5	99.0	not recorded	0.8
Providence ...	40.3	53.3	93.6	64	0.6
Melrose I ...	36.5	57.5	94.0	55	1.9
Melrose II ...	40.4	47.4	97.8	73	2.0
Petit Paquet I ...	38.4	59.9	58	1.3	—
Petit Paquet II ...	38.8	58.8	97.6	79	2.3
Vuillemin I ...	—	—	—	—	—
(Q/Militaire) ...	43.9	53.5	97.4	61	2.6
Vuillemin II ...	37.1	59.1	96.2	47	4.6
Vuillemin III ...	40.3	57.8	98.1	81	1.9
Average ...	39.5	57.4	96.9	64.6	2.0

TABLE 9.4

EFFECTS OF TYPES OF COW-BYRE ON CAPTURES OF STABLE FLIES
FOR PERIOD 5 SEPTEMBER TO 28 NOVEMBER 1977 IN THE
QUARTIER MILITAIRE AREA

Week ending	No. of flies caught weekly in	
	Byre made of brick walls and covered with tin roof	Typical straw hut byre made of sugarcane straw
12. 9.77	281	35,822
19. 9.77	2,512	23,854
26. 9.77	2,042	31,198
3.10.77	5,743	53,529
10.10.77	2,160	57,362
17.10.77	7,239	77,463
24.10.77	11,953	113,265
31.10.77	10,887	72,356
7.11.77	12,592	61,301
14.11.77	14,338	42,682
21.11.77	4,558	12,884
28.11.77	1,485	8,854
Average number of flies/day ...	891.4	6,947.9

DISCUSSION

The preliminary results obtained so far indicate that the trapping method has a high potential for fly control in the cow byres where neither the economics of milk production nor the management facilities permit the use of insecticides.

The results in Table 9.2 show the high density of stable flies that prevailed in the study area, as well as the efficacy of the traps. No other method could possibly eliminate such large number of flies from the environment. The results (Fig. 9.4) also show the important variation which exist in the populations of stable flies, a characteristic of the ecology of *S. nigra*.

The decline in the size of captures observed in the second half of November may be a result of the trapping method, since the climate (Fig. 9.4) and availability of breeding grounds in the harvested cane fields remained favourable to the fly.

Table 9.3 shows that the predominant species caught in the traps is *S. nigra*, 96.9% of flies caught belonging to that species. The distorted sex ratio in favour of females indicates that females may feed more frequently than males, a behaviour associated with maturation of eggs.

The nutritive state of captured flies varied from unfed, partially fed to fully engorged flies. Very few fully engorged flies were observed in the traps, indicating that the flies may be disturbed by the light source to which they are attracted before completion of the blood meal. An average of 35.3% of the flies examined did not contain any trace of blood and were classified as "unfed". There may therefore be an important number of flies which enter the byre but rush to the illuminated trap before feeding.

Table 9.4 and Fig. 9.5 show the influence of the type of byre on the size of the catches. The typical straw hut (Fig. 9.2) does not afford any protection to the cattle against flies. The flies are strongly attracted by the smell of the cow and penetrate freely inside the byre by the poorly fitting "door" as well as by the numerous interstices in the straw bundles. In contrast, the brick-walled, tin covered byre (Fig. 9.3) considerably restricts the entry of flies.

CONCLUSION AND RECOMMENDATIONS

The trapping method provides a cheap, easy and unpollutive technique for controlling *S. nigra* in the cow byres of the humid zones. A trap is estimated to cost Rs 10, but if made on a large scale, the price could be reduced to Rs 8.50. The manipulation of the trap is simple, as it only needs to be cleaned 2 to 3 times per week. The villagers of the district have shown considerable interest for the trap and have reported a visible improvement in the fly situation.

WEEKLY NUMBERS OF STABLES FLIES COLLECTED IN COWBYRES BY MEANS OF FUNNEL TRAPS

No. of Byres with one Trap each - 8 Region: Quartier Militaire
 ○ Rainfall Recorded at Sans Souci Estate

FIGURE 9.4

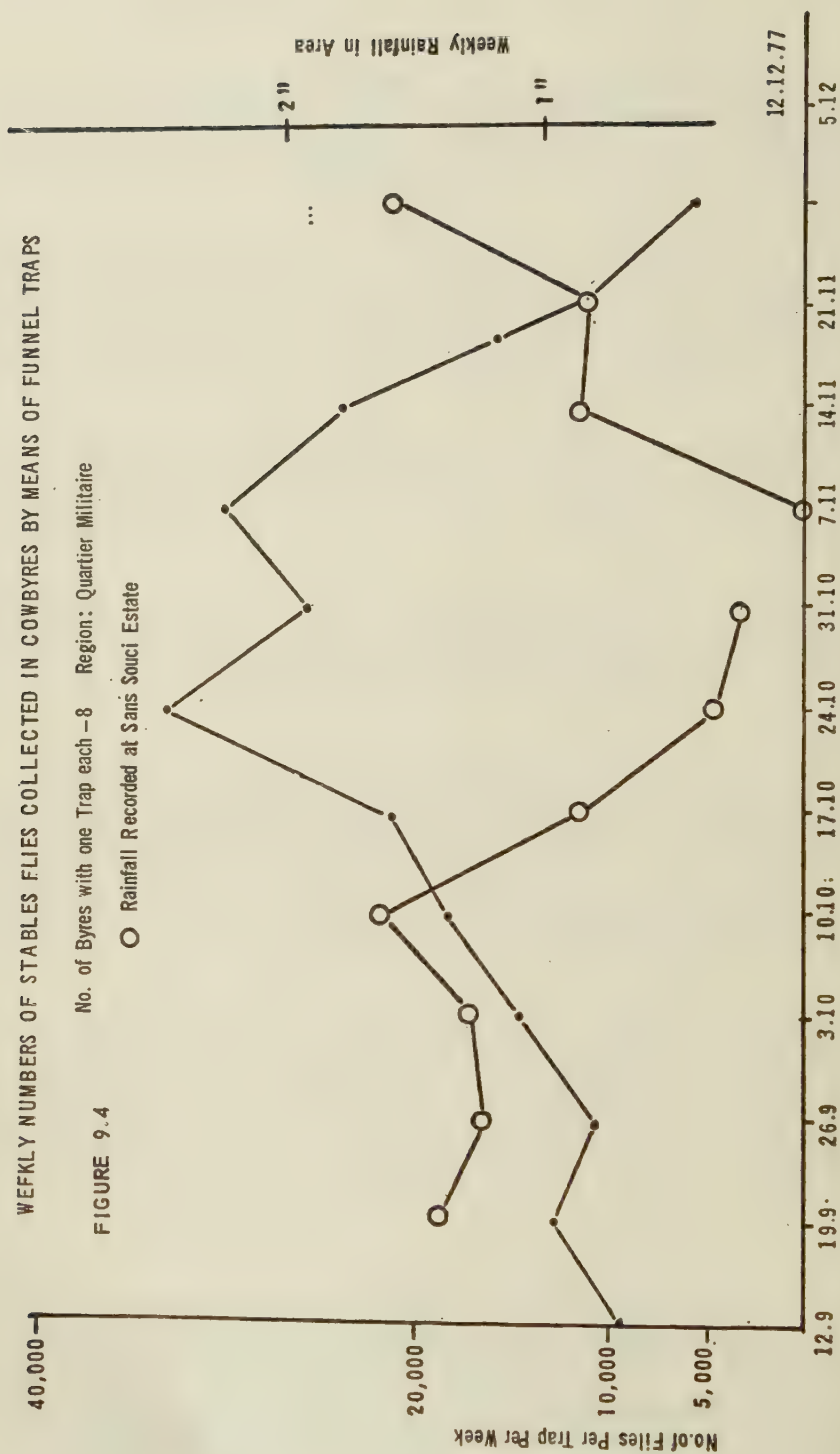
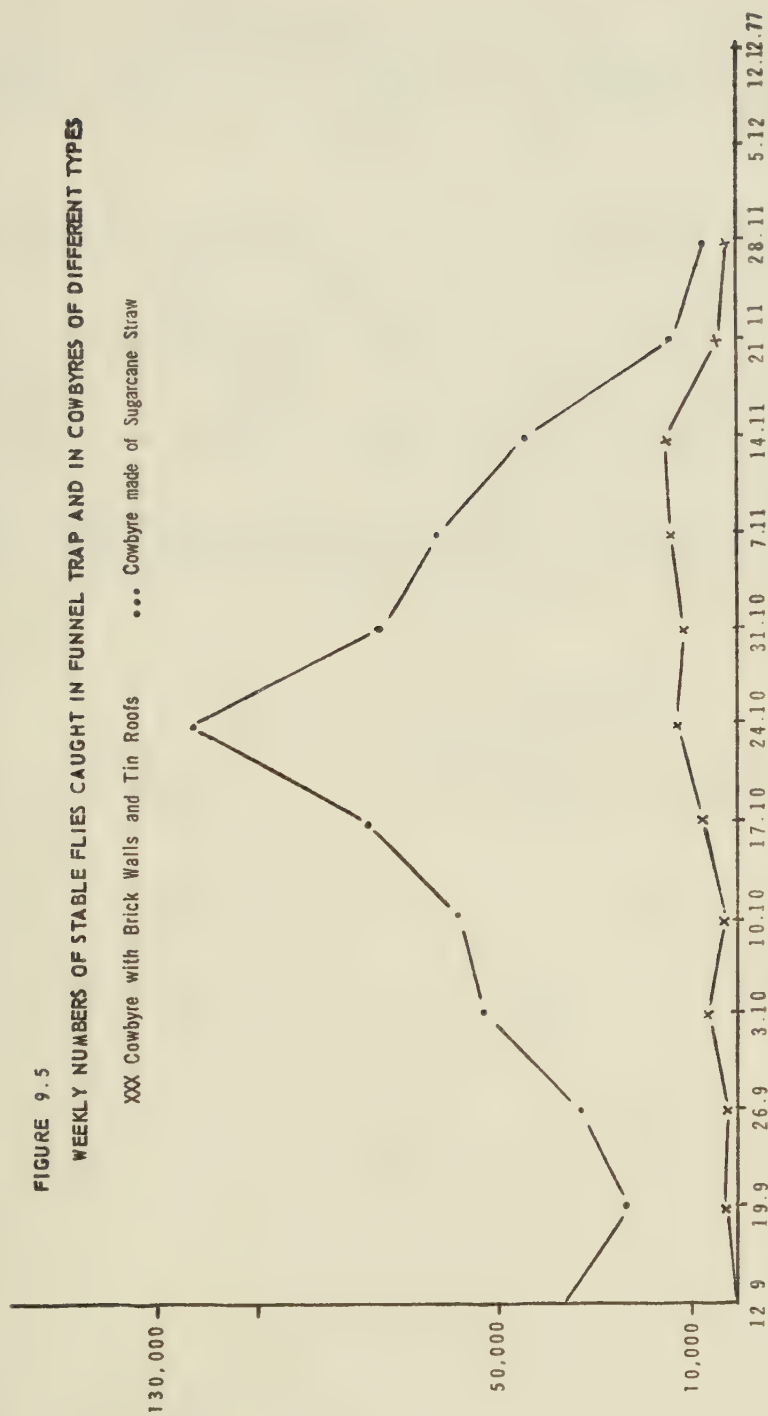


FIGURE 9.5

WEEKLY NUMBERS OF STABLE FLIES CAUGHT IN FUNNEL TRAP AND IN COWBYRES OF DIFFERENT TYPES

XXX Cowbyre with Brick Walls and Tin Roofs ... Cowbyre made of Sugarcane Straw



It is therefore intended to set up a pilot project for the financial year 1978-79 for the control of flies in the Moka-Flacq districts. A survey of the area would be made to determine the number of existing cow byres and each of 500 owners would be given on loan, one funnel trap. Television and Radio broadcast as well as the Extension Services should be sufficient to condition the villagers for participation in the project.

9.2.3. *Biological Control of stable flies* (by SCIENTIFIC OFFICER S. I. BALLUCK)

9.2.3.1. *Production and Release of Parasites of Stomoxys nigra*

Tachinaephagus sp.; a larval-pupal parasite of *Stomoxys nigra* is being produced for release since 1975. The colony is subject to extreme fluctuations and there are periods when it is completely decimated. From the beginning of the year till June the production remained low. Releases were effected from July to November.

Trichopria sp. which was previously thought to be a larval-pupal parasite of *Stomoxys* was found to parasitise only pupae. For rearing purposes 1 to 2-day old pupae of *Stomoxys nigra* were used.

TABLE 9.5

RELEASE OF PARASITES OF *Stomoxys nigra* in 1977

Month	<i>Tachinaephagus</i> sp.		<i>Trichopria</i> sp.	
	No. release	Locality	No. release	Locality
April ...	—	—	21,971	Henrietta La Brasserie
May ...	—	—	83,395	Henrietta
June ...	—	—	125,862	Henrietta, Rduit
July ...	42,000	Henrietta Rduit	19,000	Henrietta
August	107,731	Henrietta Rduit	51,000	Henrietta, Rduit
September	42,722	Henrietta, La Brasserie	14,000	Henrietta, Rduit
October	194,344	Henrietta, Riche-en-Eau, Melrose	11,000	Rduit
November	373,425	Riche-en-Eau, Melrose		
December	—		—	
TOTAL	760,222		326,228	

9.2.3.2. *Recovery of Parasites*

Pupae of *Stomoxys nigra* collected from ecological studies (see Chapter 9.2.4.) were kept for emergence and the parasitism determined. Table 9.6. summarizes the results of parasitism for the year in the different localities are given in Table 9.7.

Although its levels of parasitism are still low, *Tachinaephagus* sp. was recovered in all parts of the island except the west localities (Bel-Ombre and Case Noyale). This Encyrtid parasite, introduced from Uganda, appears to possess good dispersing powers since it has been recovered in many areas remote from release sites. It is more abundant in the super humid zones of the island where *S. nigra* is a most serious pest.

Trichopria sp. is a naturally occurring Diapriid parasite. The same species of insect was found to occur in Uganda and was introduced together with *Tachinaephagus* sp.. It was multiplied easily in the laboratory and released in a large numbers. However, its effects in the field seem to be quite insignificant and its propagation has been discontinued. The low level of parasitism obtained with *Trichopria* sp. confirm the general opinion that Diapriid insects are not important bio-control agents.

TABLE 9.6

PARASITISM IN *S. NIGRA* FROM PUPAE COLLECTED IN SUGARCANE FIELDS IN SUPER-HUMID AND HUMID ZONES

Month	Super-humid Zone						Humid Zone						
	No. of pupae observed	No. of flies emerged	Percentage Parasitism				No. of pupae observed	No. of flies emerged	Percentage Zone				
			Total	Tachinae-phagus sp.	Trichop-ria sp.	Spalan-gia sp.			Total	Tachinae-phagus sp.	Trichop-ria sp.	Spalan-gia sp.	
January	...	410	159	39.8	28.3	10.7	0.7	141	103	3.5	2.8	0.7	NIL
February	...	150	57	22.0	12.0	9.3	0.7	11	1	9.1	9.1	NIL	NIL
March	...	25	6	12.0	4.0	NIL	8.0	164	90	22.0	NIL	0.6	21.3
April	...	3818	2311	24.6	13.5	7.9	3.3	13	3	7.7	NIL	7.7	NIL
May	...	120	68	33.3	10.0	20.8	2.5	28	24	7.1	Nil	3.6	3.6
June	...	250	146	11.6	6.8	4.4	0.4	57	55	1.8	Nil	1.8	Nil
July	...	368	181	36.1	26.4	9.0	0.8	59	57	Nil	—	—	—
August	...	380	325	5.5	1.1	1.8	2.6	278	208	6.5	5.8	0.7	Nil
September	...	672	510	14.1	7.6	4.2	2.4	374	159	28.1	20.3	2.1	5.5
October	...	1009	688	29.9	20.1	7.5	2.3	339	190	16.5	7.1	3.8	5.6
November	...	891	386	35.2	21.7	9.8	3.8	223	126	8.5	1.8	0.9	5.8
December	...	722	228	41.6	33.7	6.8	1.1	230	44	7.4	0.4	0.4	6.5
Average	...	734.6	422.1	25.5	15.4	7.7	2.4	159.6	68.3	9.8	4.0	1.8	4.0

TABLE 9.7

PARASITISM IN *S. NIGRA* FROM PUPAE COLLECTED IN SUGARCANE FIELDS DURING YEAR 1977

Locality	No. of pupae observed	Percentage Parasitism			Total
		<i>Tachinae-phagus</i> sp.	<i>Trichopria</i> sp.	<i>Spalangia</i> sp.	
Bassin-Palma ...	213	1.9	1.4	1.4	4.7
Bel Ombre ...	168	Nil	0.6	20.8	21.4
Bois Chéri ...	127	8.3	Nil	Nil	8.3
Case Noyale ...	14	Nil	Nil	Nil	Nil
Chamarel ...	502	22.1	3.4	1.4	26.9
Ebene, Réduit ...	741	3.5	7.6	2.6	13.6
Henrietta ...	6191	17.2	7.6	2.8	27.6
Melrose ...	141	42.6	19.1	Nil	61.7
Midlands ...	394	8.6	3.3	1.0	12.9
Quartier Militaire ...	903	21.9	8.4	1.1	31.5
Riche-en-Eau ...	32	3.1	Nil	59.4	62.5
Rose Belle ...	175	0.6	0.6	1.7	2.9
St. Aubin ...	350	2.0	1.1	4.0	7.1
Sans Souci ...	409	17.6	9.8	2.2	29.6
Savannah ...	454	0.4	0.7	7.5	8.6
Vuillemeine ...	41	36.6	Nil	Nil	36.6
Average ...		11.8	3.9	6.8	22.5

9.2.3.3. Notes on the Biology of *Trichopria* sp. and *Tachinaephagus* sp.(a) *Trichopria* sp. (Diapriidae)

Longevity

Parasites of more or less uniform age were crossed in pairs and supplied with 5 one-day old pupae of *Stomoxys calcitrans*. The daily mortality of the parasites was recorded and a fresh supply of pupae given each day. The females lived on an average for 6 days.

It was observed that there was no significant difference in the longevity of parasites fed with water or diluted honey. Females lived longer than males.

Fecundity

In the above experiment, the last female died on the 21st day but pupae were parasitised only till the 10th day. Each female parasitised an average of 0.48 pupae per day and produced an average of 7.03 offsprings per day. The average number of parasites produced by each female was 44.7.

Stage of host parasitised

The last larval instar and the pupal stages were tested. The larvae were 6 and 7 days old and the pupae were freshly formed and one-day old. It was found that only the pupae collected 24 hours after exposure to the parasites yielded offsprings. *Trichopria* sp. therefore parasitises only the young pupal stage of *S. nigra*.

Occurrence of Parthenogenesis

Trichopria sp. was found to exhibit arrhemotokous parthenogenesis i.e. unmated females produced only male offsprings while mated ones gave progeny of both sexes.

Observations on mating habits

Experiments with a virgin male enclosed with several virgin females for 24 hours showed that a single male is capable of fertilising from 5 to 14 females with an average of 9. Other tests in which a male was offered several females in succession showed that a single male fertilize a maximum of 23 females with periods of rest.

Females were found to mate twice, at the most.

(b) *Tachinaephagus* sp. (Encyrtidae)

Longevity and Facundity

In a study on the longevity and fecundity of *Tachinaephagus* sp. one male and one female were provided with 10 six-day old larvae daily.

The average lifespan of the female was 2 days. Females lived longer than males.

The parasites were found to lay their full complement of eggs within 24 hours of being in contact with the host. The average number of parasites produced per female was 37.9. The average number of parasites per pupa was 7.9. The average number of larvae parasitised by one female was 4.7.

Occurrence of Parthenogenesis

Like most species of parasitic Hymenoptera, *Tachinaephagus* sp. exhibits arrhemotokous parthenogenesis.

Observations on mating habits

A premating period is inexistant as matting takes place immediately upon emergence. The process is extremely short, lasting for a few seconds.

Females mate only once while a male can fertilize several females.

Host Preference in the laboratory

Tachinaephagus sp. does not attack *Musca domestica* larvae but parasitises both species of *Stomoxys*

Larvae of *S. nigra* and *S. calcitrans* were compared so as to find out if there is a preference for either host. 10 mated females were provided with 50 larvae of *S. nigra* and 50 larvae of *S. calcitrans*. The results are tabulated below

TABLE 9.8

PARASITISATION OF *S. nigra* AND *S. calcitrans* BY *Tachinaephagus* sp.
(AVERAGE 5 REPLICATES)

			<i>S. nigra</i>	<i>S. calcitrans</i>
No. of pupae recovered	...	...	42.8	48.2
No. of pupae parasitised	...	...	7.2	13.6
No. of parasites produced	...	...	49.4	91.2
Average number of parasites per pupa	...	...	6.6	6.7

The results show that there is a slight preference for *S. calcitrans* over *S. nigra*. However, there was a higher mortality in the larvae of *S. nigra* than in *S. calcitrans* as the latter is better adapted to laboratory conditions than *S. nigra*. The results, though useful for the multiplication of the parasites in the laboratory, is not important as far as the efficacy of the parasite is concerned because *S. nigra* is found in sugarcane fields while *S. calcitrans* breeds in manure.

Stage of host parasitised

5, 6, 7 and 8 day old larvae, and fresh pupae were tested. Larvae of all ages were parasitised but pupae were not attacked. Variation among the replicates was too high to allow any conclusion as to which larvae are preferred.

Multiple parasitism in S. nigra

As there are two main species of parasites attacking *Stomoxys nigra* in the field, viz. *Tachinaephagus* sp., a larval-pupal parasite, and *Trichopria* a pupal parasite, it was desirable to know whether both species are capable of developing in the same host.

Larvae were exposed to *Tachinaephagus* sp. and on pupation, again exposed to *Trichopria* sp. A control was kept in which only *Tachinaephagus* sp. was used.

TABLE 9.9

PARASITISATION OF *S. nigra* BY *Tachinaephagus* SP. AND *Trichopria* SP.

	Replicate		R1	R2	R3	R4	R5	Total	Mean
No. of pupae recovered	...	...	24	25	25	25	25	124	24.8
No. of pupae parasitised by <i>Tachinaephagus</i> sp.	...	...	11	18	15	11	16	71	14.2
No. of pupae parasitised by <i>Trichopria</i> sp.	...	...	3	1	2	6	1	13	2.6
No. of pupae parasitised by both (unemerged)	...	...	1	1	Nil	1	1	4	—

	Replicate (Control)		C1	C2	C3	C4	C5	Total	Mean
No. of pupae recovered	...	...	22	25	24	25	23	119	23.8
No. of pupae parasitised by <i>Tachinaephagus</i> sp.	...	...	19	23	22	23	20	107	21.4

Very few pupae were apparently parasitised simultaneously by both parasites, and these did not emerge. Multiple parasitism has up to now, not been recorded in field collected material.

Effect of altering the agricultural practices of "Relevage" on the population of pupae in sugarcane fields

Stomoxys nigra breeds almost exclusively in the trash piled in alternate rows in sugar-cane fields soon after harvest. Preliminary investigations were carried out to find out whether changing the practice of "relevage" brings about any difference in the density of pupae found in the fields. Two areas were available for this purpose, Henrietta and Beau Bois.

- (a) The fields at Henrietta has an area of about 11 acres. In 3 acres of the field the customary "relevage" was not done so that instead of having alternate rows with deep piles of trash, all the interlines contained some trash. Unfortunately a completely non-mulched field where the straw is scattered uniformly throughout could not be obtained.

The trash was sampled twice a week for pupae of *S. nigra*, using the unbiased systematic sampling method, i.e. the 1st sample was chosen at random and other samples were taken 100 feet apart. The sampling unit was one square metre. In the control (normal field) samples were 50 feet apart.

The results are tabulated below. The estimated total number of pupae was calculated thus: No. of pupae/sample X are of breeding site. The area of breeding site was taken to be 1/3 the total field (since 1/3 of the field is covered with trash) in the normal field, and 2/3 of the total field in the experimental field as trash was piled in two rows.

The results show that in two replicates the estimated population of pupae was higher in the mulched field (B) as compared to the non-mulched field (A). However, the study should be replicated in different fields so as to come to a definite conclusion.

TABLE 9.10

POPULATION OF PUPAE IN MULCHED AND NON-MULCHED FIELDS

Replicate	No. of samples	No. of Pupae collected	Estimated No. of pupae in the field
R1 — A ...	146	11	610
B ...	146	114	3,160
R2 — A ...		7	305
B ...		47	1028
R3 — A ...		4	184
B ...		5	116
R4 — A ...		0	—
B ...		0	—

A — Non-mulched field

B — Normal, mulched field

A similar study was carried out at Beau Bois where a field of 5 acres was left with completely scattered trash. Unfortunately not a single pupa was collected either in the experimental field or in the control.

9.2.4. *Population studies and Sterile Insect Release Technique* SCIENTIFIC OFFICER—M. RAMSAMY

9.2.4.1. *Introduction*

Several aspects of research pertaining to the feasibility of eradicating the stable fly *Stomoxys nigra* (Macquart) by the Sterile Insect Release Method were investigated.

9.2.4.2. *Mass rearing of S. nigra*

Mass production was tested from July to December (Table 9.11.). The adult room which has a floor space of 28 m² can contain a maximum of 280 cages. 20 to 24 cages were set in daily and the same number containing old flies were removed. When conditions were optimal mean daily egg output fluctuated between 31.5 ml to 52.6 ml. The eggs were highly fertile, hatch exceeded 70%.

Output pupae from the larval room which has a floor space of 12 m² and a capacity for 440 larval trays fluctuated between 83,000 to 115,000 daily. When all conditions were optimal production exceeded 100,000 per day.

9.2.4.3 *Studies on the dispersal ability of laboratory reared flies by marking, release and recapture*

The holding container

A very simple holding container was designed for marking flies and for carrying them to the field. This container consists of a plastic bucket which measures as follows: floor diameter, 16 cm; Upper diameter, 22 cm; and height, 21 cm. The inner wall, floor and ceiling of the container were abraded with sand paper to permit flies to have a strong grip over these resting surfaces. Two roughly equilateral triangular openings were cut out from the cover. These openings were fitted nylon screen glued on the cover. Pharate pupae (distinguished by their dark puparia) were placed at the floor of these containers in batches averaging 1,000 and adults were allowed to emerge within two days. The newly emerged adults were fed (through the triangular openings in the cover) on sponge soaked with warmed citrated blood.

Marking

The flies, when ready for release, were marked by a simple technique. Fluorescent powder was put in the tank of a small mechanically operating dusting apparatus. The holding container with its adults was held in a slanting position and the nozzle of the duster was applied to one of the two 'openings' in the ceiling of the bucket. By turning the handle of the duster at a speed of about 3 to 5 revolutions per second a cloud of fluorescent dust was made whose particles rapidly deposited on the insects, marking their wings, halteres, antennae and legs. Less than 5 seconds are sufficient to mark one bucketful (about 750-950) of flies. Although there was a gradual loss of particles as the marked insects aged, adequate fluorescent dust adhered to the flies as to make them recognisable up to the end of their life.

Release and capture

Marked flies were carried to the point of release in a jeep. The covers of the buckets were then opened and flies were allowed to disperse. Yellow sticky traps were placed daily for four consecutive days at different distances from the point of release to monitor the range of dispersal with time.

Table 9.12. presents data on: releases of marked flies, the distance the flies travelled and some idea of the time flies lived in the environment. In most cases a number of marked flies have been collected within one day on traps placed at various distances from the point of release. Nine times out of a total of 18 trials, flies have been recorded four days from the time of release on traps placed at considerable distances from the point of release. It is thought that these results are fair indications that rearing, marking, holding and transportation do not alter the biological fitness of the flies to such an extent as to render them unsuitable for sterile insect release purposes.

9.2.4.4. Estimation of the daily emergence of *S. nigra*

The daily emergence of *S. nigra* was estimated from data collected during a pupal population census conducted throughout the year in the sugarcane fields of the humid and super humid zone, which according to Kunz and Monty (1974) constitute the principal breeding ground of the stable fly in Mauritius.

From January to July the method of sampling employed was rather inconstant. Two to four fields were sampled daily and the surface area of trash screened varied from 50 to 250 m² per field, depending mainly on the availability of man power. A sampling programme was perfected by the start of the 1977 sugarcane harvest and by the end of July, the census was carried out according to that scheme.

Ten localities were sampled per fortnight, 5 in the super-humid zone and the remaining 5 in the humid zone. At each locality six fields were chosen (according to the age of their trash) and from each field 25 unbiased systematic samples of 1 m² of the interline trash were examined *in situ*.

The estimated total number of pupae T_z per fortnight for each zone was calculated as follows:

$$\hat{T}_z = U_1 a_1 + U_2 a_2 + \dots U_n a_n$$

$$\text{or } \hat{T}_z = \sum_{i=1}^r U_i a_i$$

m₂ square metre

U_i estimated mean number of pupae per sample of trash of age *i*.

a_i acreage of trash of age *i* in M² (calculated and adapted from Bulletin Hebdomadaire of MSIRI)

r number of age/classes available at any particular fortnight.

The estimation of daily adult emergence, $\hat{E}$ was calculated as follows:—

$$\hat{E} = \frac{\hat{T}}{\text{average 1 duration of the pupal period}}$$

Results are presented in Table 9.13

9.2.4.4.1. *Factors affecting emergence*

The number of flies emerging daily is influenced by several factors whose interactions produce a characteristic yearly cycle. The population cycle shows: 1) a period of rise from the time of harvest (June) up to mid-harvest (September); 2) a plateau from September up to the end of harvest (January) and 3) a period of decline from January to March. From March to the end of May there is a period of crisis and the population of immature stages is sustained mainly in the interline trash of fields harvested for cuttings.

The most important factors causing the fluctuation of *S. nigra* are thought to be the following:

1. Harvest of sugarcane—which determines the amount and state of the principal breeding material, trash and sugarcane debris;
2. Parasites and predators and;
3. Physical factors: temperature, evaporation rates and rainfall.

Sugarcane harvest

Harvest is the principal event affecting the number of each member of the invertebrate community living within the sugarcane ecosystem. As soon as harvest starts, fresh sugarcane leaves, sugarcane tops and debris become available. These materials which constitute the main food source of the immature stadia of *S. nigra* are thought to be powerful attractants for gravid females.

Figures 9.6 and 9.7 show how the mean number of pupae per square metre sample of trash vary with the time of harvest. Pupae start to appear in the trash of freshly harvested fields as from the first fortnight. Their number increase regularly up to the time when the trash has become 2 to 3 months old. Pupal number then start to fall. When the trash is about 6 to 7 months old, scarcely any pupae are found in it. The state and amount of trash is therefore the overriding factor determining the abundance of *S. nigra* in nature. Fresh trash and trash decomposed to a certain degree are suitable for the development of the immature stadia. Past a certain age, the debris no longer sustains larval development.

Parasitism and predation

Besides the three species of Hymenopterous parasites commonly met with in *S. nigra* (discussed in the section on biological control), a number of unspecialized polyphagous and zoophagous arthropods also invade the sugarcane fields as soon as harvest starts. The commonest are: 1) red ants; 2) cockroaches; 3) spiders; 4) centipedes and 5) millipedes.

FIGURE 9. 6

EFFECT OF AGE OF TRASH ON PUPAL DENSITY

(HUMID ZONE)

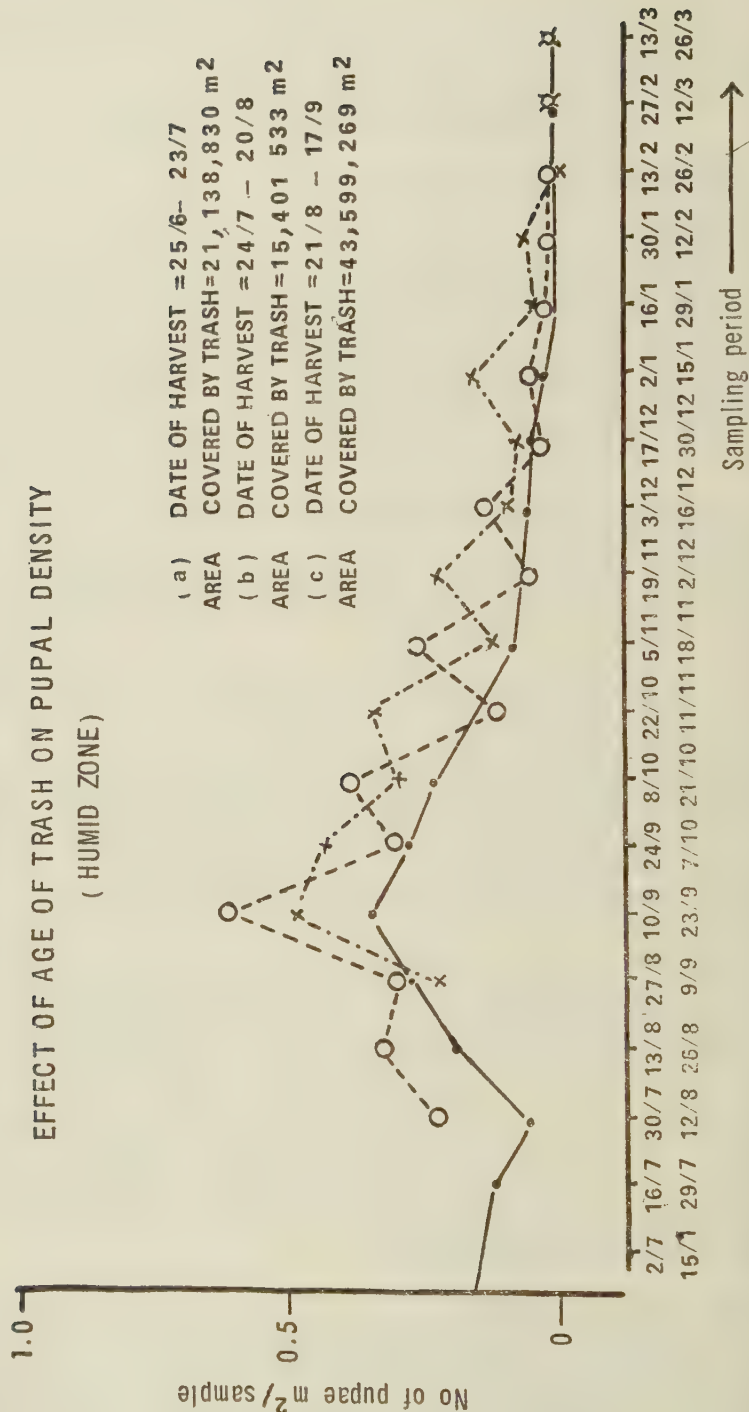
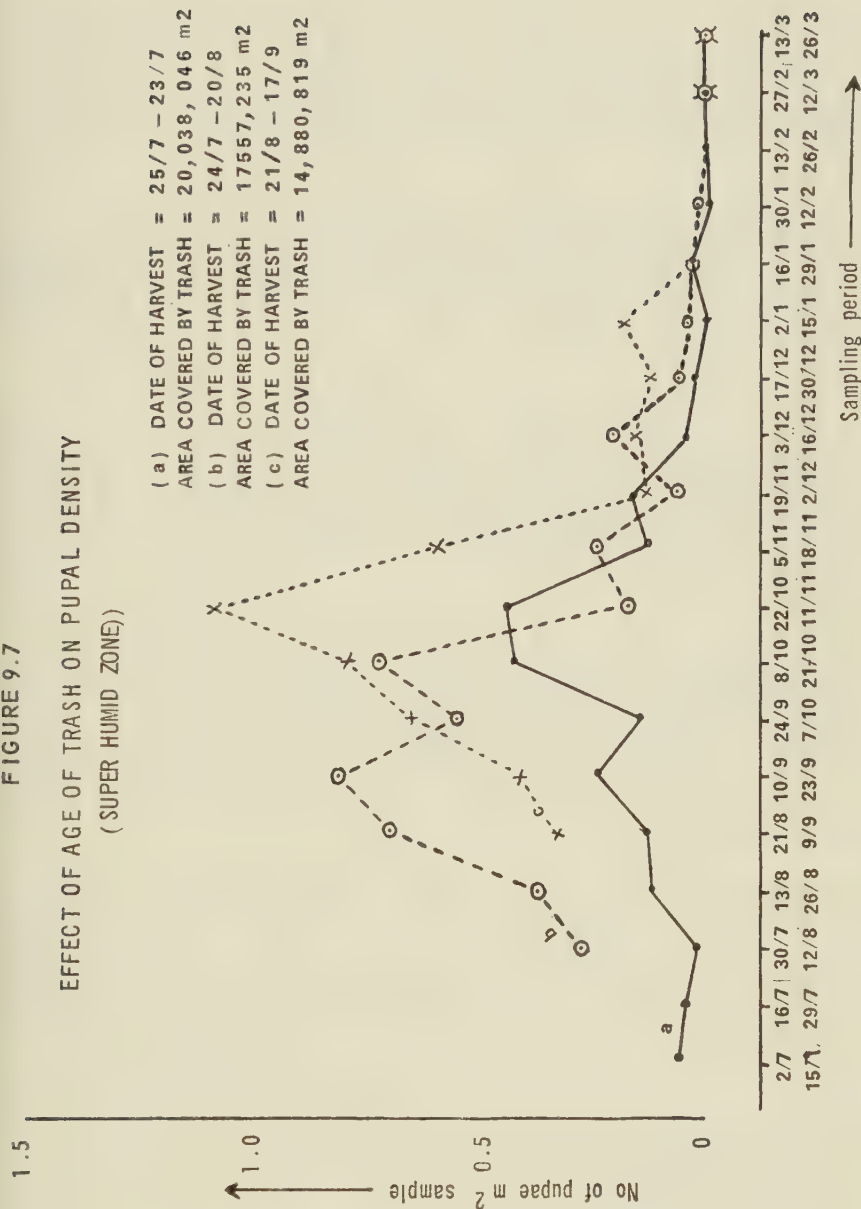


FIGURE 9.7

EFFECT OF AGE OF TRASH ON PUPAL DENSITY
(SUPER HUMID ZONE)



The number of these species build-up as from the start of harvest. Both the polyphagous and zoophagous species may find the immature stadia of *S. nigra* convenient sources of food. Red ants have often been seen carrying eggs and pieces of pupae of *S. nigra*. In samples of trash invaded by ants pupae are few and often some are met with in the process of being eaten.

Physical factors: temperature, evaporation and rainfall

Pupal mortality as a result of the direct action of the ambient physical factors prevailing at the Reduit station, although impressive, in certain fortnight, was somewhat erratic. Pupal mortality fluctuated from fortnight without any definite pattern or trend. There does not appear to be any correlation between survival and rainfall.

9.2.4.5. The population sustained by fields harvested for cuttings

Table 9.13. presents data on the emergence of flies in the fields harvested for sugar production. A limited number of fields however are annually harvested for producing cuttings. Such acreages, when harvested outside normal harvest season produce fresh trash which serves as the main fly breeding ground when development in the acreage harvested for sugar production has practically stopped.

9.2.4.6. The life cycle of S. nigra under ambient conditions

To study the life cycle of *S. nigra* throughout the year, adults were captured weekly at cowbyres and reared under natural conditions of light, temperature and relative humidity. Biological parameters were kept on the wild flies and the F_1 generation. In order to keep the traits of the F_1 generation as close as possible to those of the wild type, the immature stadia were developed on freshly shredded elephant grass (or sugarcane leaves) to which only water was added.

Table 9.14. presents (a) the mean generation time of *S. nigra* under ambient conditions (the formula used was : $P_e + P_l + P_n + j + \frac{K S_a^k}{1 - S_a^k}$ — adapted

from Cuellar and Cooper (1973); and (b) the net reproductive rate of increase in the absence of regulative factors other than those mentioned below (the formula used was : $\frac{S_e \cdot S_l \cdot S_p \cdot f \cdot b}{1 - S_n^k}$ — also adapted from Cuellar and Cooper (1973)).

S_a —probability of daily adult survival

S_e —probability of egg survival (fertility)

S_l —probability of larval survival

S_p —probability of pupal survival

P_e —egg period in days

P_l —larval period in days

P_p —pupal period in days

K —gonotrophic cycle (day) or the mean time taken for the successive production of eggs by a gravid female after its first oviposition.

f —mean number of eggs laid per female in one batch of eggs (or laying)

b —the proportion of females per egg hatch or laying

j —preoviposition period

The egg stage was not subjected to any stress. The eggs were incubated at about 30° C.

The larval stage was subjected only to the effect of ambient temperature. The pupal stage however was subjected to the following ambient physical influences: (a) temperature, (b) rainfall, (c) relative humidity, and (d) evaporation.

The adults (females) were picked up from a group having survived the pre-oviposition period. Daily mortality was assumed to be 15% (probability of survival $S_a=0.85$) throughout the year. Such a survival rate may not be too far from reality for stable fly populations which are not infinitely large. The adults were subjected to ambient temperature and relative humidity only.

As was expected, the mean generation time was found to be minimal in peak summer and maximal in the middle of winter. The shortest generation time was recorded in January when the insect passed 1.8 days as egg, 9.3 days as larva and 9.0 days as pupae. The longest generation time was recorded in the month of July when egg period, larval and pupal period were 2.7, 17.4 and 18.9 days respectively. Extension and contraction of the period passed by each of the immature stage are attributed mainly to temperature effects.

The highest net reproductive rate achieved was 17.3 and this figure was calculated for the month of January. The lowest rate (1.7) was found to be in August. The low rate of increase in August is due to the extended life cycle at that time. The longer the life cycle, the higher the probability of mortality for the individuals of the population.

9.2.4.7. *Development of immature stadia of S. nigra in the three climatic zones*

Eggs of *S. nigra* were seeded in sugarcane trash of several localities to determine whether *S. nigra* develops in the 3 climatic zones. The areas where the eggs were seeded were: Quartier Militaire, Henrietta and Sans Souci in the superhumid zone; Savannah, Rose Belle and St. Aubin in the moderate zone; and Case Noyale in the dry zone.

The results of this experiment indicate the following:

- (a) egg hatch in all fields, whether their sugarcanes are tall or short;
- (b) eggs hatch and develop into pupal stage even in the dry zone. The scantiness of adults and immature stages in this zone is thought to be due to the moisture loving habit of the adults which presumably avoid drier situations.

9.2.4.8. *Conclusions*

The trash and sugarcane debris composted between the lines of sugarcane, being the principal breeding ground of *S. nigra*, should be destroyed after harvest. It is suggested that a suitable crop such as maize be planted in such interlines. Maize is a crop found to be suitable for plantations at a space of every two interlines in sugarcane fields without any ill effect on sugar yield (Pillay and Mamet 1978).

The concentrations of immature stadia of *S. nigra* in the trash of the small acreage harvested for cuttings is thought to be ideal for biological control purposes. The trash of such fields may be left untreated to lure *S. nigra*. Intensive releases of parasites in these areas during the period of low pest intensity (i.e. 2 to 3 months after the end of harvest) may serve to delay the build up of the population of the pest to its damaging peak. If the peak intensity of *S. nigra* could be shifted (and lowered) for a few months, the period of relief for cattle would increase.

Minimization of the pest population by overflowing the acreages harvested for cutting with parasites should be the prelude to the application of the sterile insect release method if this technique is to be implemented.

9.2.4.9. References

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WHO/VBC/73.460

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Intercropping sugarcane with Maize. *Expt. Agric.* 14 (In press)

TABLE 9.11

MASS REARING OF *Stomoxys nigra*

Interval	Mean daily input of pupae	Mean% eclosion	Mean daily output of eggs (ml.)	Mean% egg hatch	Mean volume of 500 pupae (ml.)	Mean daily volume of pupae harvested (ml.)	Mean daily output pupae
29/ 7-25/ 8	28,800	84.5	46.8	72.4	11.2	2,144	95,714
26/ 8-22/ 9	28,800	83.2	31.5	78.2	12.7	2,109	83,031
23/ 9-20/10	28,800	81.8	50.4	74.8	12.4	2,761	111,331
21/10-17/11	28,800	82.8	52.6	81.1	11.6	2,623	113,060
18/11- 8/12	28,800	83.3	45.9	81.9	12.6	2,913	115,595

TABLE 9.12

MARKING RELEASE AND RECAPTURE OF LABORATORY REARED *STOMOXYS NIGRA*

Date release	Locality	No. of flies marked and released	Distance of trap from point of release (approx.)	Time of recapture							
				Day 1		Day 2		Day 3		Day 4	
				Marked flies	Unmarked flies	Marked flies	Unmarked flies	Marked flies	Unmarked flies	Marked flies	Unmarked flies
2.8-3.8.77	Reduit	...	1½ mile	7Y	7	177Y	118	16Y	208	9Y	105
3.8.77	Moka	...	1 mile	9R	289	65Y	235	56Y	162	18Y	153
				9R		3R		2R			
4. 8.77	Nouvelle Decouverte	...	1 mile	5	73	20	80	13	67	2	41
4. 8.77	do	...	1¼ mile	—	4	—	13	8	24	—	7
4. 8.77	do	...	¼ mile	—	1	5	1	7	7	1	1
4. 8.77	do	...	1½ miles	79	13	40	13	13	13	13	48
4. 8.77	do	...	¼ miles	13	6	6	3	4	7	20	25
19. 9.77	Moka	...	¾ mile	33	26	—	17	—	5	—	9
19. 9.77	Moka	...	1 mile	—	656	—	1020	24	1160	2	1035
11.10.77	Nouvelle Decouverte	...	1½ miles	3	43	1	108	—	22	—	8
11.10.77	do	...	¼ mile	5	15	3	29	1	70	—	47
11.10.77	do	...	1 mile	2	97	1	125	—	—	—	120
11.10.77	do	...	¼ mile	2	22	2	45	—	10	—	20
19.10.77	Henrietta	...	¾ mile	2	100	14	186	1	111	—	103
19.10.77	do	...	½ mile	2	147	6	402	6	244	—	300
19.10.77	do	...	¾ mile	2	4	—	8	1	15	—	48
19.10.77	do	...	1 mile	2	57	4	145	7	171	5	188
25.10.77	Montagne Ory	...	1½ miles	4	2	1	22	—	23	1	8
7.11.77	Henrietta	...	1 mile	1	12	1	50	1	47	—	27

Y = Yellow R = Red, when not mentioned colour of marked flies was red.

TABLE 9.13

ESTIMATION OF DAILY EMERGENCE OF *Stomoxys nigra* FROM SUGAR CANE FIELDS HARVESTED FOR SUGAR PRODUCTION

Time Interval	Estimated Total population of pupae‡	Estimated Total adults emerged†	Average pupal period days*	Daily adult emergence E	Rate of Increase
1. 1 — 14. 1 ...	23,002,421	17,932,872	9.0	1,992,541	—
15. 1 — 28. 1 ...	13,700,935	6,059,307	8.0	757,413	0.38
29. 1 — 11. 2 ...	8,708,050	466,886	8.9	52,459	0.07
12. 2 — 25. 2 ...	1,561,834	690,362	6.7	103,039	1.96
26. 2 — 11. 3 ...	1,025,594	341,244	8.9	38,342	0.37
12. 3 — 25. 3 ...	467,401	181,729	8.8	20,651	0.54
26. 3 — 8. 4 ...	728,561	280,696	8.3	33,819	1.64
9. 4 — 22. 4 ...	2,499,549	867,404	9.1	96,308	2.85
23. 4 — 6. 5 ...	552,122	253,438	9.9	25,600	0.27
7. 5 — 20. 5 ...	47,392	25,582	10.7	2,391	0.09
21. 5 — 3. 6 ...	*	—	—	—	—
4. 6 — 17. 6 ...	*	—	—	—	—
18. 6 — 1. 7 ...	*	—	—	—	—
2. 7 — 15. 7 ...	601,141	355,026	15.1	23,512	—
16. 7 — 29. 7 ...	3,887,193	2,203,685	18.9	116,597	5.00
30. 7 — 12. 8 ...	5,835,272	3,420,899	15.4	222,136	1.91
13. 8 — 26. 8	18,183,641	10,628,532	14.2	748,488	3.37
27. 8 — 9. 9 ...	29,871,840	19,327,678	13.6	1,421,153	1.90
10. 9 — 23. 9 ...	47,842,644	24,172,639	13.0	1,859,434	1.31
24. 9 — 7.10 ...	41,407,352	23,744,052	15.3	1,551,899	0.84
8.10 — 21.10 ...	57,510,903	27,655,268	9.9	2,793,461	1.80
22.10 — 4. 11 ...	77,254,102	42,781,468	10.7	3,998,268	1.43
5.11 — 18.11 ...	36,858,591	20,338,571	8.9	2,285,233	0.57
19.11 — 2.12 ...	37,439,508	21,427,529	8.1	2,645,374	1.16
3.12 — 16.12 ...	36,719,282	18,474,903	9.2	2,008,142	0.76
17.12 — 30.12 ...	59,337,143	34,874,575	9.0	3,874,953	1.93

*both zones were surveyed but no pupae were found.

‡Corrected for survival from (a) parasitism

(b) physical factors

TABLE 9.14

EFFECT OF SEASONAL VARIATION ON GENERATION TIME AND NET REPRODUCTIVE RATE OF S. NIGRA

<i>Date</i>	<i>Mean Minimum Temperature C</i>	<i>Mean Maximum Temperature C</i>	<i>Total Fortnightly Rainfall (mm)</i>	<i>Mean Generation Time</i>	<i>Biotic Potent- ial (Net Re- productive rate)</i>
1. 1 — 14. 1	21.8	28.6	190.50	33.4	17.3
15. 1 — 28. 1	21.7	28.7	52.28	32.6	12.4
29. 1 — 11. 2	22.3	26.6	360.68	32.9	11.6
12. 2 — 25. 2	20.7	28.7	4.32	31.4	7.7
26. 2 — 11. 3	20.5	28.8	25.91	33.7	5.9
12. 3 — 25. 3	21.4	28.7	35.81	33.5	5.7
26. 3 — 8. 4	20.4	28.4	123.70	34.5	4.0
9. 4 — 22. 4	20.7	27.3	137.67	34.5	6.0
23. 4 — 6. 5	18.9	26.2	29.97	35.6	5.3
7. 5 — 20. 5	18.0	25.9	27.18	38.2	7.8
21. 5 — 3. 6	18.9	25.5	49.02	42.0	7.6
4. 6 — 17. 6	15.7	23.9	11.43	47.7	4.0
18. 6 — 1. 7	15.1	23.0	10.92	48.3	6.3
2. 7 — 15. 7	16.6	23.8	63.50	50.9	6.2
16. 7 — 29. 7	14.8	22.3	26.67	55.6	9.3
30. 7 — 12. 8	13.8	23.6	3.30	51.0	7.5
13. 8 — 26. 8	15.8	22.7	41.40	55.4	1.7
27. 8 — 9. 9	13.6	23.9	1.27	49.4	3.7
10. 9 — 23. 9	15.7	23.4	25.91	48.2	6.4
24. 9 — 7.10	16.8	24.8	23.11	47.6	9.8
8.10 — 21.10	15.7	24.9	5.84	46.3	7.9
22.10 — 4.11	15.8	26.5	1.52	43.7	8.8
5.11 — 18.11	18.3	27.1	7.37	41.2	3.7
19.11 — 2.12	23.6	31.2	34.04	34.5	11.2
3.12 — 16.12	24.3	30.8	51.56	34.2	15.5
17.12 — 30.12	24.2	30.3	73.91	33.5	13.4

9.3. *Fruit Fly Research*—C. HAMMES AND J. MONTY9.3.1. *Ecology of Fruit Flies*

A survey of different species of Trypetid fruit flies and their hosts has been undertaken and it has been found that the most widely distributed fruit fly is the Natal fruit-fly, *Pterandrus rosa*. This fly maintains itself on chinese guava (*Psidium cattleianum*) and Indian almond (*Terminalia catappa*) when other fruits are not available. From November onwards, *P. rosa* has been recovered from a wide range of edible and non edible fruits. The fruits of Indian almond constitute an important host for fruit flies as this plant bears fruits all the year round.

Ceratitis capitata has only been recovered as from the end of December on Indian almond, mango and chillies. This species seems to have been displaced by *P. rosa* from fruits like guava, peach and loquat.

The indigenous *Ceratitis catoiri* has not yet been recovered. The tomato fruit fly (*Pardalaspis cyanescens*) and the cucurbit fly (*Dacus cucurbitae*) are more specific on Solanaceae and Cucurbitaceae respectively and have been recovered from many Solanaceous fruits and cucurbits.

Dacus ciliatus has been obtained on Cucurbitaceae as from November. These two species, *D. cucurbitae* and *D. ciliatus* are often obtained simultaneously in the same fruits.

Dacus d'emmerezi has not yet been collected.

The different species of fruit flies and the annual sequence of their hosts are summarised below in Table 9.15.

TABLE 9.15

FRUIT FLY SPECIES AND ANNUAL SEQUENCE OF THEIR HOSTS

Year: 1977 Month	<i>Pterandrus rosa</i>	<i>Ceratitis capitata</i>	<i>Pardalaspis cyanescens</i>	<i>Dacus cucurbitaceae</i>	<i>Dacus ciliatus</i>
July	Chinese guava (<i>Psidium cattleianum</i>)		Tomato	Cucurbits	
	Jujube (<i>Ziziphus jujuba</i>)		Eggplant		
	Loquat (<i>Eryobotrya japonica</i>)				
	Indian almond (<i>Terminalia catappa</i>)				
	Pawpaw (<i>Carica papaya</i>)				
August	Chinese guava		Tomato		
	Jujube		Eggplant	Cucurbits	
	Loquat				
	Indian almond				
September	Pawpaw				
	Peach				
	Jujube		Tomato	Cucurbits	
	Loquat		Eggplant		
	Indian almond				
October	Sapodilla (<i>Achras sapota</i>)				
	Pawpaw				
	Peach				
	Loquat		Tomato	Cucurbits	
	Indian almond		Eggplant		
	Sapodilla				
	Pawpaw				
	Guava (<i>Psidium goyava</i>)				
	Bullock's heart (<i>Anona reticulata</i>)				
	Lucuma (<i>Lucuma nervosa</i>)				
November	Litchi				
	Mango				
	Peach				
	Jamalac (<i>Eugenia aquae</i>)				
	Jamblong (<i>Eugenia jambolona</i>)				
	Indian almond		Tomato	Cucurbits	cucurbits
	Sapodilla		Eggplant		
	Pawpaw				
	Guava				
	Bullock's heart				
	Lucuma				
	Litchi				
December	Mango				
	Peach				
	Jamblong				
	Jamalac				
	Sapodilla	Indian almond	Tomato	Cucurbits	cucurbits
	Indian almond	Chillies	Eggplant		
	Pawpaw	Mango			
	Guava				
	Lucuma				

Trypedid larvae have been recovered from pawpaw and mulberry but these are exceptionnaly rare cases. Other fruits like pineapple, avocado, breadfruit, bilimbi (*Colea pedunculata*), carambola (*Averrhoa carambola*), Jaboticaba sp. Mangoustan sp., tangerine, orange, grape-fruit, pomme-jacot (*Mimusops bogeri*), "Fruit-de-cythère" (*Spondias cytherea*) and apple have been found to attract fruit flies. However, no larval development has been observed in the fruits even though oviposition had taken place.

9.3.2. Laboratory Rearing of *Pterandrus rosa*

The rearing of *Pterandrus rosa*, already established in the laboratory since 1971 is being improved. Tests are being carried out on the different components of the larval medium to find out whether an improved diet could be developped and eventually be used in mass rearing programme.

Table 9.16. gives the pupal yields obtained from September to November using the present rearing technique.

TABLE 9.16

% PUPAL YIELD OF *PTERNADRUS ROSA* IN THE LABORATORY

Year 1977 Month		Mean % Egg Hatch	Mean Pupal Yield % fertile eggs	Mean Pupal Yield % eggs
September	...	79.8	8.7	6.9
October	...	61.8	16.0	9.9
November	...	61.2	26.3	16.1
December	...	51.6	45.3	23.4

These figures illustrate that considerable improvements can be made in the rearing techniques, (including better environmental factors such as air-conditioning and lighting), to ensure continued satisfactory production of flies.

9.3.3. Population Dynamics of *Pterandrus rosa*

An extensive survey of different host plants, and types of environment favourable to the development of the species has been undertaken. *P. rosa* has been found to develop on a wide range of fruits throughout the year (see Table 9.15) and the problem of population studies must be carefully planned.

Population studies are facilitated in the homogenous type of vegetation found in the uncultivated zones where chinese guava dominates. In other areas where the host fruit trees present a heterogenous agroecosytem, these studies are more complex. A survey of suitable host fruits will need to be csarried out on an island-wide basis. This survey, which will give the seasonal and regional abundance of fruits, together with a study of fly density per tree, will help to establish the levels of fly populations and their fluctuations.

Three types of surveys are being carried out, as described below.

9.3.4. Traps

(a) Coloured Sticky Traps

These traps which are fluorescent yellow in colour serve to provide information on the relative fly population for different periods and areas. The traps have been placed in different localities since September. The trap is made of a rectangular plywood board measuring 15 × 10 cm. covered on both sides with fluorescent yellow adhesive paper. The trap is ensealed in transparent plastic envelope coated with a non-drying glue of type used as ant barriers. The number of traps placed on fruit trees vary from 2 to 8. Results of catches are shown in Table 9.17.

TABLE 9.17

AVERAGE NUMBER OF *P. ROSA* CAPTURED PER STICKY TRAP FOR PERIOD SEPTEMBER — DECEMBER 1977

Host Plant	Trapping period in days	Number of flies/trap
<i>Mangoustan</i> sp. ...	100	57
Loquat ...	110	30
Sapodilla ...	170	28
Bilimbi ...	110	16
Lucuma ...	130	11
Indian almond ...	95	11
Mango ...	95	10
Peach ...	115	9
Litchi ...	80	8
Bullock's heart ...	55	6
Guava ...	110	3
Avocado ...	95	2
Jujube ...	30	1

Note: Scientific names are given in Table 9.15.

The traps attract flies only when fruits are present on the trees. In the case of *Mangoustan* sp., which attracted strongly *P. rosa*, no larval development was noticed in the fruits.

(b) Sex-Lure Traps

Studies started in November, using Capilure as an attractant specific to *Ceratitis capitata*. Very few flies were caught, confirming the relative rarity of the Mediterranean fruit-fly. Studies with traps using Trimelure will be started in January 1978.

The traps used are white plastic containers in which four to five holes have been made depending on the size of the containers. A piece of cotton wool containing a few drops of the attractant is placed inside the container. The inside of the container is coated with the insecticide Ciodrin a (croto-scypfos) to kill the attracted flies.

9.3.5. *Collection of Fruits*

Collection of fruits is carried out from trees and soil to determine the relative importance of different fruits as hosts of fruit flies and the annual sequence of these hosts. The fruits are placed on a layer of sand in boxes. The pupae produced are counted and kept for emergence of flies. Table 9.18. shows the results.

TABLE 9.18

INFESTATION OF FRUITS BY *PTERANDRUS ROSA* FOR PERIOD
SEPTEMBER — DECEMBER 1977

<i>Host Fruit</i>	<i>No. of Fruits collected</i>	<i>% Fruits with punctures</i>	<i>No. of Pupae collected</i>	<i>No. of Pupae per fruit</i>	
Chinese Guava ...	1330	100	841	0.63	
Loquat ...	963	100	914	0.95	
Jujube ...	476	not recorded	74	0.16	
Indian almond ...	1730	not recorded	5473	3.2	
Bullock's heart ...	21	100	581	27.7	
Peach {	Green ...	493	100	183	0.37
	Mature ...	368	100	263	0.71
	Ripe ...	193	100	208	1.08
Total ...	1054	100	654	0.62	
Jamalac ...	92	not recorded	26	0.28	
Litchi ...	554	15	3	0.005	
Mango ...	385	15	225	0.58	
Sapodilla ...	32	not recorded	39	1.2	
Jamrosa ...	215	not recorded	16	0.07	
Lucuma ...	40	100	163	4.1	

These first results show that different fruits vary in their importance as hosts for the Natal fruit-fly. Bullock's heart is an exceptionally good host for the development of *P. rosa*. In peaches, the development of larvae depends upon the degree of maturity of the fruits. The more mature peaches seem to harbour more larvae.

Indian almond is another host which is highly attacked by *P. rosa*. and it also plays an important role in the maintenance of the population of flies in the field as the tree bears fruits nearly all the year round.

Notes:

1. Scientific names of plants are given in Table 9.15.
2. Late in December, small numbers of *Ceratitis capitata* were obtained from mango, Indian almond, and chilly (*Capsicum annum*)
3. The data for Chinese Guava, Loquat and Jujube were collected at the end of their fruiting season. More details will be collected next year.

A high incidence of attack has been found in Lucuma. Sapodilla also seems to be favourable to the development of larvae. Litchis are very rarely attacked and larval development is exceptionally rare even in very ripe and rotting fruits. Mangoes are also attacked but incidence of damage is still being investigated.

A number of fruits collected have been placed individually in cups for breeding. The results (Table 9.19) are similar to those obtained in collective breeding where all the fruits are grouped in one box, but they show that the two fruit-flies do not develop simultaneously in the same fruit.

TABLE 9.19
OBSERVATION ON INDIVIDUAL FRUITS COLLECTED FROM SOIL AND TREE

Date of collected	Locality	Fruit collected from tree or soil	No. of fruits	Total No. of pupae produced	Species Emerged	No. of Males	No. of Females	% Emergence	No. of Pupaefruit
26. 9.77	Barkly ...	Indian almond (soil)	100	307	<i>P. rosa</i>	132	154	93.2	3.07
14.11.77	Barkly ...	Litchi (soil)	42	0	—	—	—	—	—
14.11.77	Reduit ...	Peach (soil)	39	45	<i>P. rosa</i>	10	10	44.4	1.05
15.11.77	Abercrombie	Mango (soil)	50	0	—	—	—	—	—
21.11.77	Barkly ...	Litchi (tree)	49	0	—	—	—	—	—
21.11.77	Barkly ...	Litchi (soil)	50	0	—	—	—	—	—
28.11.77	Barkly ...	Litchi tree	35	1	—	—	—	—	0.03
5.12.77	Barkly ...	Litchi (soil)	49	0	—	—	—	—	—
12.12.77	Barkly ...	Litchi (tree)	50	4	<i>C. capitata</i>	0	2	50.0	0.08
15.12.77	Curepipe	Peach (soil)	13	29	<i>P. rosa</i>	7	7	48.3	2.23
15.12.77	Abercrombie	Mango (soil)	35	1	<i>P. rosa</i>	1	0	100.0	0.03
15.12.77	Abercrombie	Mango (tree)	21	12	<i>C. capitata</i>	3	5	66.7	0.57

Note:—Scientific names of plants given in Table 9.15.

9.3.6. Pupal Population Studies

As a first step towards the evaluation of absolute densities, it would be interesting to survey the pupal populations which develop exclusively in the soil under the host trees.

The study of pupae from the soil consists in taking a series of soil samples of 1 or 2M² from the upper 5-10 cm thickness of the soil where pupae of fruit-flies are usually present. The pupae are then recovered by flotation methods.

In the uncultivated and uninhabited zones of the Central Plateau where Chinese guava dominates the fruit-tree vegetation with definite homogeneity, the pupal population per acre can be assessed directly from these samples. Assessment is more complicated in built-up areas where fruit trees are scattered in backyard gardens. It will therefore be necessary to evaluate the surface occupied by host trees in towns and villages. To this effect a national survey of host trees is being conducted, and soil samples for pupae are also taken in private orchards and yards.

The preliminary results are summarised in Table 9.20.

TABLE 9.20

SAMPLING OF PUPAE FROM SOIL IN DIFFERENT LOCALITIES

<i>Fruit</i>		<i>Locality</i>	<i>Date of Sampling</i>	<i>Surface area square metre (M²)</i>	<i>No. of pupae</i>	<i>No. of pupae/M²</i>
Chinese guava	...	Tamarin Falls	... 11. 8.77	6	7	1.1
		Tamarin Falls	... 22. 8.77	3	0	0
		Chamarel	... 31. 8.77	2	0	0
		Tamarin Falls	... 8. 9.77	2	3(E)	
Jujube	...	Beau Rivage	... 12. 8.77	3	0	0
		Beau Rivage	... 24. 8.77	6	3(E)	
		Beau Rivage	... 14. 9.77	2	3(E)	
Loquat	...	Labourdonnais	... 2. 9.77	3	55(E)	
		Labourdonnais	... 14. 9.77	1	0	
Indian Almond	...	Pointe aux Sables	... 26.10.77	2	0	0
		Mahebourg	... 28.10.77	2	0	0
		Pointe aux Sables	... 7.10.77	2	8	4
		Pointe aux Sables	... 17.10.77	2	0	0
Peach	...	Réduit	... 21.11.77	2	6	3
		Réduit	... 12.12.77	2	0	0
		Réduit	... 19.12.77	2	3(E)	
		Richelieu	... 9. 1.78	2	13+22(E)	6.5
		Richelieu	... 16. 1.78	2	4+4(E)	2
		Richelieu	... 23. 1.78	2	25	12.5
		Abercrombie	... 11. 1.78	2	0	0
		Abercrombie	... 18. 1.78	2	0	0

Notes: Scientific names of plants are given in Table 9.15

(E)=Empty Puparia.

9.3.7. *Natural enemies*

During the course of these studies when hundreds of larvae and pupae *P. rosa*, *D. cucurbitae* and *P. cyanescens* were handled in the laboratory, very few parasites were collected. These invariable were found to be an *Eucoila* sp., occurring naturally in Mauritius. None of the parasites introduced during the past 18 years were recovered.

Sericulture

A. JOOMAYE—SCIENTIFIC *Officer*

AND

N. K. GANESH—SERICULTURAL EXPERT

9.4.1. *Moriculture*

It was proposed to plant about ten acres of mulberry at La Brasserie, but only one acre could be planted because land and labour were not made available. Survival of the mulberry in the one-acre plot was very low due to water logging and the plantation was abandoned.

During the year, sixty-one persons registered their names as cocoon producers and fourteen planted a total of twelve acres with either cuttings or rooted saplings supplied freely by the Division. The total area of mulberry owned by private planters at the end of the year 1977 was twenty acres.

9.4.2. *Silkworm Rearing*

(a) Rearing of Pure Races

Pure race rearings were carried out at Réduit for seed production. The five pure lines (M_1 , M_2 , M_3 , M_4 and M_5) were reared in 13 crops yielding 133,506 cocoons, weighing 232 kg.

The average yield per 100 layings was 61.417 kg. (36,236 cocoons) and is considered as excellent. The number of cocoons per kilogram was 590.

(b) Rearing of Hybrids

Hybrids of seven selected combinations were prepared and reared on the following stations: Flacq, Pamplémousses, Barkly, Curepipe, Plaisance and Rivière-des-Anguilles. 921 layings were reared and 498 kg. of cocoons were produced.

The average yield of 54.1 kg. per 100 layings was quite satisfactory.

9.4.3. *Seed Production*

Seeds are produced from cocoons obtained from the pure lines. Out of 135,506 cocoons produced from five pure lines, 31,914 were selected and used for seed production.

During the year 1,564 layings of pure lines were prepared from 4,542 cocoons and 27,370 cocoons were used to prepare hybrid seeds.

As from February 1977, only hybrid crosses between M_3 , M_4 and M_5 were used to produce seed as it was found that these combinations were giving richer layings and better yields.

9.4.4. Cocoon Production by Private Rearers

During the year seventeen rearers have started to produce cocoons. The table below shows details.

TABLE 9.21

PRIVATE REARERS

		No. of Layings reared	Yield of Cocoons (kg)	Yield of Cocoons/100 Layings (kg)
1. Bois Chéri (21 crops)	...	612	309.065	50.50
2. St. Félix (4 crops) ...	...	80	47.600	59.500
3. Rajman Joysing (11 crops)	...	113	56.300	49.823
4. Industrial School (4 crops)	...	62	29.000	46.774
5. Currimjee (8 crops)	...	150	90.300	60.200
6. Other Small Rearers (12 crops)...		397	149.420	37.637

Average yield of cocoons per 100 layings for all rearers was 49 kg.

It can be seen that the yield of cocoons for the five rearers are above 45 kg. which is considered to be a good result. The yield of 37.637 kg. per 100 layings of the small rearers has improved compared to last year (36 kg.) but there is still room for improvement.

The total production of cocoon by all private rearers was 681.7 kg. and the average yield per 100 layings works out to be 49 kg. a figure which is quite satisfactory.

Reeling

A silk reeling machine with 48 ends received from India was installed at Curepipe Experimental Centre in October. Small scale reeling was started since. The machine is capable of coping with the reeling of cocoons produced by up to 50 acres of mulberry.

9.5. Miscellaneous Pests

9.5.1. The "Flamboyant" (*Delonix regia* Boj.) suffered severe defoliation during the months of February to June through the activities of an unrecorded leaf-hopper (Homoptera, Cicadellidae). Specimens were sent for identification to the Commonwealth Institute of Entomology who reported that the insect was a new species which could not be fitted into any described genus of the family. The new genus and species are being described by Dr. M.S.K. Ghauri of the Commonwealth Institute of Entomology.

Simultaneously with the damage observed in Mauritius, reports were received that the same leaf-hopper was affecting the Flamboyant in Reunion Island. From the simultaneous occurrence of the problem in Reunion and Mauritius, as well as from the island wide distribution of the pest, it can be concluded that the insect is not a recent introduction. It must have remained unnoticed until the building up of its enormous population observed in 1977.

The insects are sap feeders and their activities on the leaflets cause the typical "leaf hopper burn:" the foliage progressively loses its green colour to assume a uniform brown appearance prior to shedding of the leaflets. Although the insects were found (exclusively on flamboyant) throughout the island, the most spectacular defoliations occurred in the cities of Quatre Bornes, Rose-Hill and Beau Bassin and along the scenic road of Soreze which is lined with flamboyant trees throughout its 1-mile twining length.

No damage was observed on young actively growing trees, indicating that the insect preferred mature foliage. This observation seemed to be confirmed in December, when the Cicadellid was still very rare on the new foliage.

The severe defoliations occurred shortly before winter when mature Flamboyant trees normally shed their leaves. All the severely affected trees started sprouting normally in October and by early December, most of the trees had started to bloom. No dead tree has yet been observed.

Predators such as lady birds (Coccinellids, *Chilocorus* spp. and *Exochomus laeviusculus* and the green lace-wing (*Chrysopa* sp.) have been observed to be associated with the pest. A chalcidoid parasite, frequently hyperparasitized by an Eulophid was also collected on the leaves. The upsurge of the pest may well have been caused by a breakdown in the activities of its natural enemies. The situation is under study because the Flamboyant in Mauritius has important decorative functions related to the Tourist Industry and to the attachment of Mauritians for the beauty of the environment.

9.5.2. The Coconut Beetle *Oryctes Rhinoceros* (L.)

The coconut rhinoceros beetle continued to be kept under control by the virus *Rhabdionvirus Oryctes*. Surveys showed that the disease is present throughout the island. Sporadic outbreaks of the pest continue to occur in the south of the island where isolated and old trees suffer more damage than the trees grown in groves. However, the beetle does not cause death to trees and it is considered that it cannot be better controlled without important financial investments. Efforts are being made to encourage the widespread planting of coconut palms, the only practical solution to reduce the number of beetles per coconut tree.

9.5.3. *The Banana Leaf-Roller Erionota Thrax L. (Lepidoptera, HesperIIDae)*

The banana leaf-roller was abundant on the banana plants grown in backyard gardens in the Plaines Wilhems district. None of the egg and larval parasites successfully established in 1972 was recovered.

The banana leaf roller is a peculiar insect that feeds exclusively on banana leaves. It shows a pronounced preference for the tall "Ollier type" variety or the "Gingeli" variety and very rarely affects the dwarf "Ollier" variety which is commercially grown. The feeding activity of the insect is restricted to the months of November to June. The caterpillar lives inside rolls made of leaf tissues held together by silk threads. It is also a large insect, the other HesperIIDs existing in Mauritius being much smaller. Its parasites must therefore be very specific and can only survive in the presence of adequate numbers of the host. The severe cyclone which hit Mauritius in February 1975 decimated all the banana trees of the island. The resulting scarcity of the leaf roller during the season 1975-76 may have been enough to cause the elimination of the parasites, which although established were not yet very abundant. If the parasites (*Ooencyrtus erionotae* Ferriere and *Apanteles erionatae* Vilbn.) are still not found during the 1977-78 season, their re-introduction from Thailand will be considered.

9.5.4. Papaw trees were severely affected by the mite *Polyphagotarsonemus latus* (Banks) (determined by Mr. D. Macfarlane of the Commonwealth Institute of Entomology). The mite was prevalent in the drier localities and caused severe distortion and stunting of the leaves. Adequate control was provided by sprays of Folimat (Omethoate).

9.5.5. The scale insect, *Vinsonia stellifera* Westw. was extremely abundant on Jamalac trees (*Eugenia aquae* Burm.) in the southern regions of Port Louis. The lower surfaces of all leaves were thickly covered with the star-shaped, brilliant red, hard scales. This is the first record of this Coccid, described from Mauritius, reaching pest proportions. It is to be noted that the year 1977 seems to have been favourable for the extraordinary development of at least three Homopteran insects, viz. the sugarcane scale *Pulvinaria iceryi* Guer., the Flamboyant Cicadellid (gn. and sp. nov.) and *V. stellifera*.

9.5.6. Onion seedbeds were reported to be severely affected by soil pests which considerably reduced the availability of seedlings for transplanting. The regions most affected were La Chaumiere on the western slopes and Grands Sables on the Eastern Coast. Upon examination, the pest was found to be the mole-cricket, *Gryllotalpa africana* P.B. Drenching the seed-bed with toxaphene at sowing was recommended, pending a study of the problem.

9.5.7. The lawn cut-worm, *Crambus seychellelus emmerezellus* Joan. was severe on lawns of the Gymkana golf course at Vacoas. Spot treatments with toxaphene were advised.

X. Agricultural Chemistry Division

HEAD OF DIVISION: L. C. LAM THUON MINE, DIVISIONAL SCIENTIFIC OFFICER

10.1. Introduction

The Division mainly deals with all the analytical work involved in the research programme of other divisions of the Ministry. Odd samples coming in from the private sector have also been considered. With the setting up of the F 17 gas Chromatograph, several methods for determining pesticide residues in crops have been developed and various experiments in this field have been carried out.

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10.2. Soil

10.2.1. The Extension Service Division submitted 28 samples of soil collected throughout the island from small planters' fields. These were analysed for pH, available phosphorus and potassium. The data obtained served as a basis for the recommendation of appropriate fertilizer application to the planters. Table 10.1 shows the determinations carried out on the samples from different districts.

TABLE 10.1

DETERMINATIONS ON SOIL SAMPLES FROM DIFFERENT DISTRICTS

<i>District</i>	<i>No. of Samples</i>	<i>Determinations</i>
Flacq ...	8	pH, P, K
Pamplemousses ...	8	pH
Savanne ...	7	pH, P, K
Plaines Wilhems ...	1	pH, P, K
Moka ...	2	pH, P, K
Rivière du Rempart ...	1	pH
Grand Port ...	1	pH, P, K

10.2.2. 298 samples of soil in connection with the experiments conducted by the Agricultural Division were analysed. Table 10.2 shows various determinations carried out.

TABLE 10.2

VARIOUS DETERMINATIONS ON SOIL SAMPLES RELATED TO
DIFFERENT EXPERIMENTS

<i>Experiment</i>	<i>No. of Samples</i>	<i>Determinations</i>
Response to phosphorus by tea planted in the presence of different mulchings ...	240	pH, P
Fertilizer trial for rice — Belle Vue Substation ...	19	pH, N, P, K, O.M*
Fertilizer and variety trial for rice — FUEL ...	18	pH, N, P, K
Fertilizer trial for rice — Richelieu E.S. ...	6	pH, N, P, K
Fertilizer trial for ginger ...	1	pH, N, P, K, O.M*
Fertilizer trial for tobacco ...	12	pH, N, P, K, O.M*
International Soybean Variety Evaluation ...	2	pH, N, P, K

*O.M. — Organic Matter

10.2.3. 30 samples of soil in relation to various experiments set up by the Projects Division were received. These were analysed for pH, N, P, K, and organic matter. Table 10.3 indicates the number of samples analysed for each experiment.

TABLE 10.3

pH, N, P, K, ORGANIC MATTER DETERMINATIONS ON SAMPLES
RELATED TO VARIOUS EXPERIMENTS

<i>Experiment</i>	<i>No. of samples</i>
To compare the effect of different water regime on the yield of tomatoes (Pomme d'amour) ...	4
To compare the effect of six different furrow spacings on the yield of beans (green pods) with a given water regime	7
To evaluate the effect of 3 water regimes and 3 nitrogen levels on tobacco	9
The Northern Plains Irrigation Pilot Project ...	10

10.2.4. 46 odd samples of soil received from different sources were also dealt with. Table 10.4 gives details of various determinations.

TABLE 10.4

VARIOUS DETERMINATIONS ON SOIL SAMPLES FROM DIFFERENT SOURCES

<i>Sender</i>	<i>No. of Samples</i>	<i>Determinations</i>
Plant Pathology Division ...	2	Salinity
Plant Pathology Division ...	1	Water holding Capacity
Plant Pathology Division ...	10	Moisture
University of Mauritius ...	3	pH, N, P, K, O.M*, C.E.C†
Ministry of Co-operatives ...	2	pH, N, P, K
Tobacco Board	1	pH, N, P, K
Tea Development Authority ...	3	pH
Wooton Experiment Station ...	3	pH, P, K
Chinese Agricultural Team ...	12	pH, Soluble salts, N, Na, K, Ca, Mg, Cl, HCO ₃ , CO ₃ , SO ₄
Chinese Agricultural Team ...	9	pH, N, P, K, O.M*

10.3. Fertilizers

10.3.1. 17 samples of compound fertilizers were received from various organisations for formulation check. Table 10.5 shows the chemical determinations carried out.

*Organic Matter

†Cation exchange capacity

TABLE 10.5

ANALYSES OF FERTILIZERS FROM VARIOUS ORGANISATIONS

<i>Organisation</i>	<i>No. of Samples</i>	<i>Determinations</i>
Mauritius Chemical & Fertilizer Industry ...	3	N, P_2O_5 , K_2O , MgO
Mauritius Chemical & Fertilizer Industry ...	5	N, P_2O_5 , K_2O ,
Mauritius Chemical & Fertilizer Industry ...	1	N
Nouvelle Industries Ltee	3	N, P_2O_5 , K_2O , H_2O
Mount S.E.	1	N, P_2O_5 , K_2O
Mont Desert Alma S.E.	2	N, P_2O_5 , K_2O
Mon Desert Alma S.E.	1	P_2O_5
Bel Ombre S.E.	1	P_2O_5

10.3.2. The following samples were analysed for N, P, K and moisture in order to assess their fertility status:—

- (i) 1 sample of cow manure from Agricultural Division
- (ii) 1 sample of cow manure from Chinese Agricultural Team
- (iii) 1 sample of chicken manure from Chinese Agricultural Team
- (iv) 2 samples of compost from Chinese Agricultural Team

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10.4. *Water*

10.4.1. 2 samples of well-water from the Ministry of Co-operatives and 4 samples from Flacq Demonstration Centre were received for the assessment of their suitability for irrigating vegetables. The pH, Na, Ca, Mg, CO_3 , HCO_3 , and total dissolved solids determinations were carried out and their salinity and sodium hazards computed.

10.4.2. The Ministry of Fisheries submitted 13 samples of water for the determination of nitrate ions.

10.5. *Miscellaneous Analyses*

Some odd samples from other divisions of the Ministry and the private sector were also analysed. The details are shown in table 10.6.

TABLE 10.6

ANALYSIS OF VARIOUS SAMPLES

<i>Sender</i>	<i>Samples</i>	<i>No. of Samples</i>	<i>Determinations</i>
Private Estates ...	Dipping bath ...	7	AS ₂ O ₃
Extension Service Division ...	Jeboterex ...	1	NH ₄ , SO ₄ , Cl Na, K
Cane Planters and Millers Arbitration and Control Board ...	Molasses ...	1	N, P ₂ O ₅ , K ₂ O
Tea Board ...	Tea ...	6	Crude fibre
M.C.F.I. ...	Sodium trichloroacetate ...	2	Purity check
Wooton Experiment Station ...	Tea waste ...	1	Phosphorus
Animal Production Division ...	Unknown Chemicals ...	7	Complete identification
Agricultural Division ...	Coconut leaves ...	1	N, P, K, Ca, Mg
Livestock Feed Factory ...	Inorganic salts ...	4	Complete identification

10.6. *Tea Leaves*

10.6.1. In connection with the experiment started by the Agricultural Division at Wooton Tea Experiment Station in October 1976, to study the response to phosphorus (Triple Superphosphate) by tea planted in the presence of different mulchings such as bagasse, sawdust, tea waste and dry litter coming from pruning, tea leaves were collected regularly at monthly intervals during 1977 for analysis. This experiment which was scheduled to last over a period of 6 years requires the following determinations.

- (i) Top 4-inch soil pH.
- (ii) Total phosphorus content in the bud and first leaf and in the third leaf.
- (iii) Available phosphorus in the top 4-inch soil.

480 samples of tea leaves were collected during the year. Out of these 316 samples were analysed for total phosphorus. The remaining 164 will be dealt with in early 1978. 240 soil samples were also collected and analysed — see under Soil Section 2.2.

The results obtained are summarized in table 10.7

TABLE 10.7

THE MONTHLY MEAN PHOSPHORUS PERCENTAGES IN THE FIRST AND THIRD LEAF ON A DRY MATTER BASIS (D.M.) WITH RESPECT TO DIFFERENT MULCHINGS

<i>Mulch</i>	% Phosphorus (D.M.)	
	<i>1st Leaf</i>	<i>3rd Leaf</i>
Control ...	0.47	0.34
Bagasse ...	0.47	0.34
Sawdust ...	0.47	0.35
Tea Waste ...	0.46	0.34
Tea Litter ...	0.47	0.35

The results obtained showed that tea did not respond to phosphorus in the presence of different mulchings.

10.6.2. Concurrently with the tea experiments set up by the Agricultural Division, a small leaf analysis survey was carried out on the representative Field 6 (ex-field 3) at Wooton Experiment Station as from January 1976. The data obtained will provide a general idea of the leaf nutrient levels to be expected throughout the year in healthy tea in Mauritius and at the same time a basis for comparison in the interpretation of results of analyses of unhealthy or low yielding tea.

Out of 174 samples of first, second and third leaf collected throughout 1976 and 1977 for the analysis of N. P. K. 141 (72 for 1976 and 69 for 1977) were dealt with during 1977. A summary of the results of samples collected throughout 1976 is presented in table 10.8 and illustrated in Figure 10.1, 10.2, and 10.3. The results for samples collected throughout 1977 will appear in the 1978 annual report.

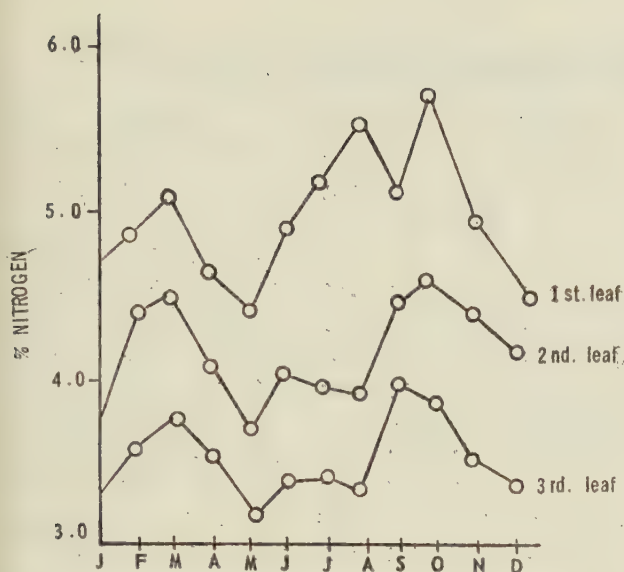


Fig. 10.1 - Seasonal Nitrogen Variation

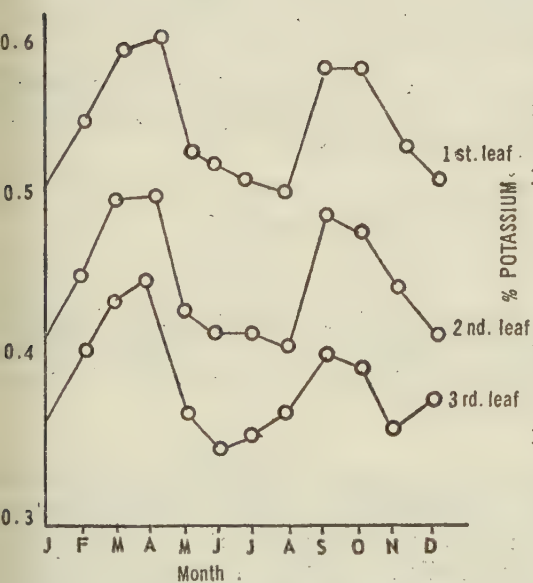


Fig. 10.2 - Seasonal Phosphorous Variation

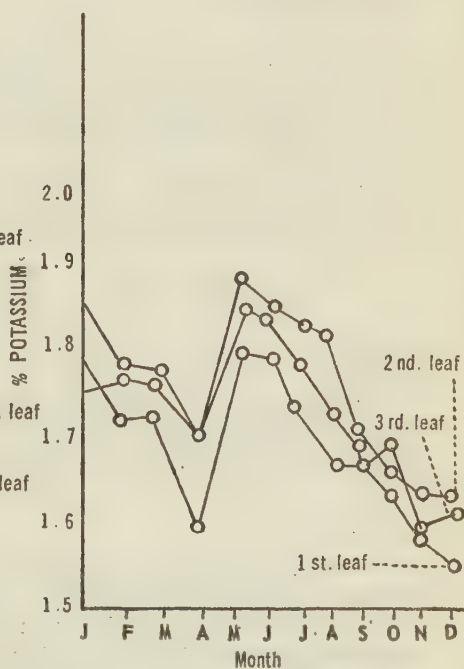


Fig. 10.3 - Seasonal Potassium Variation

TABLE 10.8

MEAN MONTHLY PERCENTAGE OF N, P, K IN 1ST, 2ND AND 3RD LEAF ON A DRY MATTER BASIS (FOR 1976)

Month	1st Leaf			2nd Leaf			3rd Leaf		
	% N	% P	% K	% N	% P	% K	% N	% P	% K
January	... 4.71	0.51	1.80	3.78	0.42	1.86	3.35	0.37	1.77
February	... 4.87	0.55	1.73	4.40	0.46	1.80	3.58	0.41	1.79
March	... 5.12	0.60	1.74	4.51	0.51	1.79	3.80	0.44	1.78
April	... 4.66	0.61	1.60	4.09	0.51	1.71	3.51	0.46	1.71
May	... 4.40	0.53	1.82	3.64	0.43	1.91	3.12	0.37	1.88
June	... 4.94	0.52	1.81	4.04	0.42	1.87	3.41	0.35	1.86
July	... 5.22	0.51	1.75	3.98	0.42	1.85	3.43	0.36	1.80
August	... 5.51	0.50	1.68	3.89	0.41	1.84	3.24	0.37	1.74
September	... 5.03	0.58	1.68	4.49	0.49	1.72	3.98	0.41	1.70
October	... 5.82	0.58	1.71	4.65	0.48	1.67	3.89	0.40	1.64
November	... 4.90	0.54	1.59	4.41	0.45	1.64	3.50	0.36	1.60
December	... 4.54	0.51	1.56	4.11	0.42	1.64	3.24	0.38	1.62

10.6.3. The following factors were taken into consideration in interpreting the variability of N, P, K in tea leaves.

Fertilizer Regime

3 fertilizer treatments were applied to the Field 6 as follows:

- In September 1975 — 360 lb of Sulphate of Ammonia, 31.6 lb of triple superphosphate and 22.9 lb of muriate of potash per acre equivalent to 75.6 lb N, 6.3 lb P and 11.9 lb K per acre.
- In February 1976 — 378 lb of sulphate of ammonia, 31.6 lb of triple superphosphate and 22.9 lb of muriate of potash per acre equivalent to 79.4 lb N, 6.3 lb P and 11.9 lb K per acre.
- In September 1976 — 185 lb of the complex mixture 25-5-12 per acre equivalent to 46.3 lb N, 4 lb P and 18.4 lb K per acre.

Rainfall

The maximum rainfall at Wooton Experiment Station recorded was in January and February 1976 with a monthly mean of 17 inches and the minimum rainfall from July to October 1976 with a monthly mean of 6 inches.

Yield of Green Leaf

It can be seen from table 10.9 that the highest yield of green leaf was in March when optimum conditions prevailed, viz: fertilizer application in February, adequate rainfall and favourable temperature. Leaf production decreased very significantly during the Winter period with the lowest yield in August and then increased appreciably as from November although rainfall was still low. However the increase coincided with the fertilizers application in September and the rise in atmospheric temperature.

TABLE 10.9

MONTHLY YIELD OF GREEN LEAF IN THE REPRESENTATIVE
PLOT (0.3 ARPENT)

Month ...	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Yield kg	219	178	338	210	230	99	40	27	71	87	197	159

10.6.4. *N, P, K Variation in Tea Leaves**Nitrogen*

Figure I indicates that at any moment of the year nitrogen in a pluckable shoot increased progressively from the third to the second and to the first leaf with a monthly mean of 3.51%, 4.19% and 4.96% respectively. The nitrogen content reached a first peak in March following the first fertilizer application in February and a second peak around October after the second fertilizer application in September. The same trend of nitrogen content was observed in each leaf along the shoot.

Phosphorus

Figure II shows similar progression for phosphorus content with a monthly mean of 0.39%, 0.45% and 0.55% in the third, second and first leaf respectively. The first peak for each leaf was reached in April after the fertilizer application in February while the second peak in September just before fertilizer was applied.

Potassium

As can be seen from figure III the pattern of potassium along the shoot was different from that of nitrogen or phosphorus. The monthly mean for the first, second and third leaf were 1.71%, 1.77% and 1.74% respectively. After the fertilizer application in February potassium continued to decrease till April and then suddenly increased to a maximum in May. A similar fall in potassium level was observed after the second fertilizer application in September.

10.6.5. The data obtained from the analysis of leaves collected from January to August 1977 indicate so far that the trend in the N. P. K variations is more or less the same as that for 1976. This trend will be confirmed or infirmed after the analysis of all the samples collected during 1977.

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10.7. *Sugarcane Leaves*

From March to May 1977, 144 samples of sugarcane leaves were received from the Extension Service Division for the determination of N, P, K. These leaf samples constituted the C series, i.e. leaves from 82 fields in the Northern Plains Irrigation Pilot Project. The object of the survey was to assess the nutritional status of small planters' sugarcane fields. A summary of the results is presented in table 10.10 and represents in figure 10.4, 10.5 and 10.6.

TABLE 10.10

RESULTS OF N, P, K IN SUGARCANE LEAVES ON A DRY
MATTER BASIS (D.M.)

<i>% Nitrogen (D.M.)</i>	<i>Frequ- ency</i>	<i>% Phosphorus (D.M.)</i>	<i>Frequ- ency</i>	<i>% Potassium (D.M.)</i>	<i>Frequ- ency</i>
1.03 and under 1.31 ...	2	0.10 and under 0.13 ...	31	0.95 and under 1.05 ...	15
1.31 and under 1.59 ...	21	0.13 and under 0.16 ...	10	1.05 and under 1.15 ...	24
1.59 and under 1.87 ...	65	0.16 and under 0.19 ...	50	1.15 and under 1.25 ...	42
1.87 and under 2.15 ...	34	0.19 and under 0.22 ...	37	1.25 and under 1.35 ...	30
2.15 and under 2.43 ...	13	0.22 and under 0.25 ...	10	1.35 and under 1.45 ...	21
2.43 and under 2.71 ...	6	0.25 and under 0.28 ...	3	1.45 and under 1.55 ...	11
2.71 and under 2.99 ...	1	0.28 and under 0.31 ...	3	1.55 and under 1.65 ...	1
2.99 and under 3.27 ...	2				

The modal N, P, K values in the sugarcane leaves are shown as follows:—

Modal nitrogen content is 1.75%

Modal phosphorus content is 0.18%

Modal potassium content is 1.21%

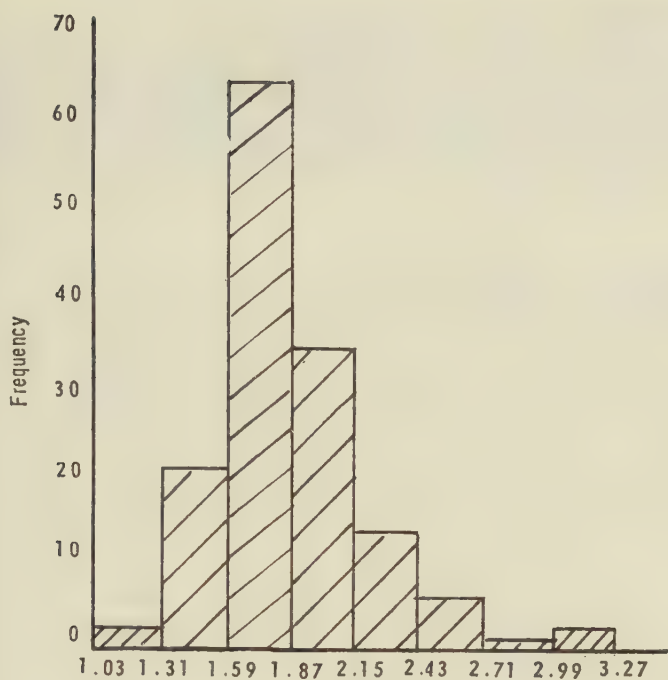


FIGURE 10.4 % Nitrogen

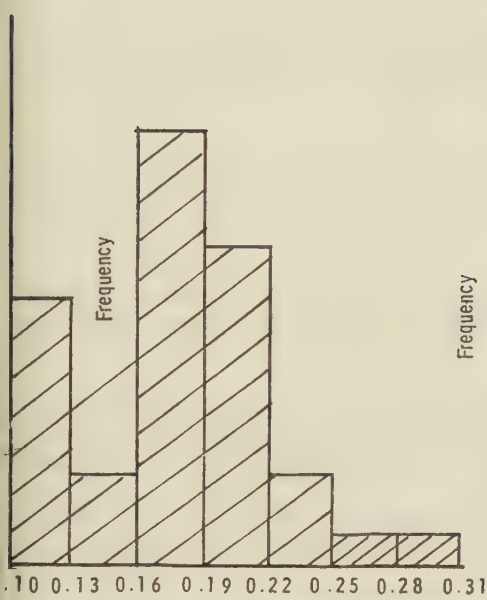


FIGURE 10.5 % Phosphorus

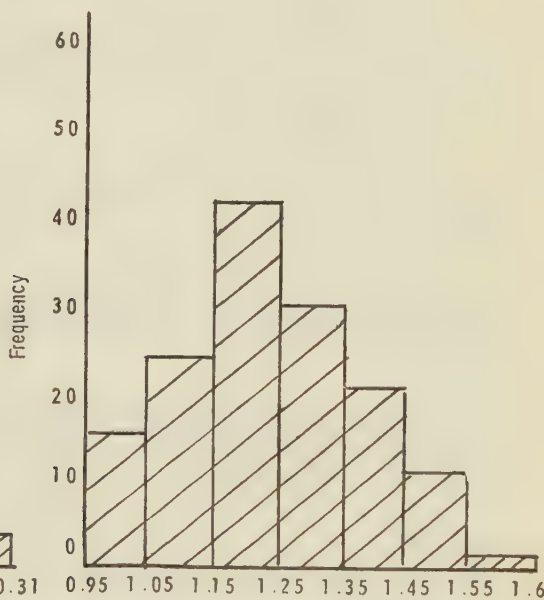


FIGURE 10.6 % Potassium

Fig. 10.4, 10.5 and 10.6: Frequency distribution of N, P, K in Sugarcane Leaves

10.8. *Cattle Manure*

The Extension Service Division submitted 109 samples of cattle manure, collected at random throughout the island, for the determination of dry matter, total nitrogen, total phosphoric acid and total potash. The aim of the survey was to assess their fertility status with a view to recommending the small planters on the correct dosage of manure application. Results are summarized in table 10.11.

TABLE 10.11

VARIABILITY OF DRY MATTER, N, P_2O_5 , K_2O IN CATTLE
MANURE FROM DIFFERENT DISTRICTS

<i>District</i>	<i>Variability of dry matter %</i>	<i>Variability of N %</i>	<i>Variability of P_2O_5 %</i>	<i>Variability of K_2O %</i>
Rivière du Rempart...	17 — 43	1.58 — 2.41	0.72 — 1.70	0.26 — 1.44
Black River ...	13 — 37	1.32 — 2.91	1.03 — 1.80	0.77 — 1.32
Plaines Wilhems ...	16 — 41	1.20 — 2.89	0.89 — 1.89	0.45 — 1.63
Moka ...	19 — 21	1.84 — 2.19	1.73 — 1.81	1.01 — 2.04
Flacq ...	14 — 41	1.05 — 2.71	0.84 — 2.08	0.31 — 1.54
Savanne ...	10 — 28	1.75 — 2.63	0.69 — 1.80	0.24 — 1.12
Grand Port ...	12 — 38	1.05 — 2.54	0.87 — 2.03	0.19 — 1.72
Pamplemousses ...	22 — 23	1.20 — 1.93	1.40 — 1.53	1.44 — 1.63

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10.9. *Feeds and Fodder*

10.9.1. Raw materials for the manufacture of animal feeds were analysed for one or more of the following:— fibre, protein, fat and fluorine in order to establish the correct formulation. The prepared feeds were then checked for their standards.

10.9.2. Local maize and molasses were regularly collected from Live-stock Feed Factory for the determination of moisture and degree brix respectively.

10.9.3. Samples of urea/molasses and silage were received from Animal Production Division for the determination of pH, protein, degree brix and urea.

10.9.4. To study the variation in the composition of sugarcane grown on the Wet Upland Areas, the Animal Production Division submitted 130 samples of sugarcane stalks and tops for the determination of dry matter.

10.9.5. In relation to the in-vivo digestibility experiment on acacia, samples of acacia and faeces were received from Animal Production Division for the determination of dry matter.

10.9.6. The Animal Production Division started an experiment to study the effect of different retention times in the production of biogas from feedlot effluent. In this connection 35 samples of fresh and digested effluent were received for the determination of pH, dry matter, nitrogen and organic matter.

10.9.7. In connection with the experiment on sugarcane as a potential source of animal feed — investigating the effects of (i) cutting interval (ii) planting date (iii) plant population at 3 levels of nitrogen fertilization on the total yield of sugarcanes — samples of sugarcane tops and stalks were received after each cut for the determination of dry matter, protein and fibre. However, as from July 1977, two of the experiments — cutting interval and plant population — had to be cancelled due to a severe attack of the insects *Pulvinaria Iceryi*.

10.9.8. In conjunction with the experiment set up by the Agricultural Division at Curepipe Experiment Station to compare the suitability of 8 grass species as a source of fodder, samples of grass were received after each cut and analysed for dry matter, fibre and protein.

10.10. *Miscellaneous Analyses*

Some odd samples from other divisions of the Ministry and the private sector were also dealt with. The details are given in table 10.12.

TABLE 10.12
ANALYSIS OF VARIOUS SAMPLES

Source	Samples	No. of Samples	Determinations
Animal Production Division ...	Feeds	10	—
	Eupatorium & Hyacinth	4	dry matter, fibre, protein
Agricultural Division ...	Grass species	14	dry matter, fibre, protein
Plant Pathology Division ...	<i>Pseudomonas</i> , solanacearum suspensions	5	protein
	... Feeds	6	protein, fat, fibre
Veterinary Division	... Feeds	9	protein, fibre
Private Sector ...	... Feeds		

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10.11. *Groundnut cakes*

Groundnut cakes were collected monthly from Livestock Feed Factory and analysed for the presence of aflatoxin. No detectable level of aflatoxin was observed. But very low levels of 0.02 ppm and 0.08 ppm were obtained in January and April 1977 respectively.

10.12. *Citrus Greening Disease* (Gentisoyl Glucose)

Some 57 samples of citrus species from various localities were examined for gentisoyl glucose. No greening symptom was detected after tetracycline treatment on the citrus plants.

10.13. *Pesticide Residues*

10.13.1. The Perkin-Elmer F 17 Gas Chromatograph for measuring pesticide residues in crops was set up in May 1977. The instrument which consists of four detectors — Electron Capture Detector (EDC), Flame Photometric Detector (FPD), Phosphorus Nitrogen Detector (PND) and Flame Ionisation Detector (FID) — is an excellent analytical tool for such work with high accuracy, selectivity and sensitivity.

10.13.2. *Organochlorine residues using the EDC*

Suitable methods for the determination of such residues in crops were studied. The sensitivity of different columns was compared. The 2-metre column packed with 0.5% SE 30+0.1% Epikote 1001 on chromosorb G 80-100 mesh was found suitable for P, P₁-DDE, O, P₁-DDT, P, P₁-DDD and P, P₁-DDT. The 5% QF-1 column was used for dieldrin because its retention time is identical to that of P, P₁-DDE on the SE 30 — Epikote column. This is one example of the possibility of misidentifying a residue by analysis on one gas liquid chromatographic column only. The use of multiple column analysis and/or one of the chemical derivatization techniques is essential for the reliable identification of an unknown residue. Thin layer chromatographic analysis can also be of value for this purpose. Aldrin in the groundnut meal could not be measured on the 5% QF-1 column because of interference from several earlier eluting peaks, which might be due to BHC isomers present in the meal. It was therefore measured on a 5% OV-210 + 6% OV-101 column.

A number of organophosphorus compounds will come through the extraction procedures used for organochlorines and will give peaks with the ECD. The use of the PND in the 'P' mode or of the FPD with the 'P' filter will prove whether or not a given ECD peak is due to an organophosphorus compound. The same column conditions must of course be used with both detectors, so that retention times are not changed.

Recovery experiments were carried out by spiking some crops with different pesticides. Results and gas chromatographic conditions are tabulated in table 10.13.

10.13.3. *Organophosphorus residue determinations*

Different extraction methods were studied. The method, involving extraction with acetonitrile and subsequent partitioning into chloroform followed by evaporation and redissolution in acetone, gave extracts which were suitable for gas chromatographic analysis using either the PND or the FPD. Dimethoate was used as the main test substance for comparing the PND or FPD since it contains P, N and S atoms. The column used for dimethoate was 2-metre of 3% Apiezon 'L' + 0.2% Epikote 1001 on chromosorb W-HP, 80-100 mesh. Good peaks were obtained for dimethoate but not for omethoate. The 2% PDEAS on gas chrom Q, 80-100 mesh column was used for azodrin and dichlorvos and gave moderately satisfactory results. A 1-metre column of the same packing, operated at a lower temperature, should give improved sensitivity because most organophosphorus pesticides have some tendency of thermal instability. The 2-metre column of 2% SE 30 + 0.3% QF-1 on gas Chromosorb Q proved to be very satisfactory for malathion and 2 metre of 5% QF-1 on chromosorb W-HP 80-100 mesh for A & B—endosulfan.

Recovery tests for various crops spiked with different organophosphorus pesticides were attempted. Results and gas chromatographic conditions are indicated in table 10.13.

TABLE 10.13

RECOVERY (%) OF DIFFERENT PESTICIDES ADDED TO VARIOUS CROPS OBTAINED BY GLC TECHNIQUES

Crop	Pesticide	Spiking Level p.p.m.	Mean recovery%	<i>G.L.C. Column and Conditions used</i>	
Lettuce ...	P, p ¹ — DDE	0.4	102	2 metre of 0.5% SE 30 + 0.1% Epikote 1001 on Chromosorb G 80—100 mesh at 175°C and 80 ml/min, ECD, injector/detector temperature at 225°C	
	P, p ¹ — DDT	0.4	84		
	P, p ¹ — DDD	0.4	87		
	P, p ¹ — DDT	0.4	76		
Groundnut Meal	Aldrin ...	0.4	73	2 metre of 8% MS 200 on Chromosorb W-AW DMCS 80—100 mesh at 200°C and 100 ml/min, ECD, injector/detector temperature at 225°C.	
Groundnut Meal	Dieldrin	0.4	110	2 metre of 5% QF-1 on Chromosorb W-HP at 185°C and 70 ml/min, ECD, injector/detector temperature at 250°C.	
Lettuce ...	Malathion	0.5	97	2 metre of 2% SE 30 + 0.3% QF-1 on gas Chromosorb Q at 185°C and 20 p.s.i., PND in the 'P' mode at 650°C injector temperature at 225°C	
Cauliflower	Dimethoate	0.5	76	2 metre of 3% Apiezon 'L' + 0.2% Epikote 1001 on Chromosorb W-HP at 195°C and 30 p.s.i. PND in the 'N' mode at 650°C injector temperature at 225°C.	
Tomatoes	Azodrin ...	1.5	59	2 metre of 2% PDE AS on gas Chromosorb Q 80—100 mesh at 215°C and 30 p.s.i., FPD, injector temperature at 225°C, detector temperature at 250°C.	
Rice ...	Azodrin ...	0.5	113	2 metre of PDEAS on gas Chromosorb Q 80—100 mesh at 195°C and 30 p.s.i., PND in the 'P' mode at 650°C, injector temperature at 225°C.	
Rice ...	Dichlorvos	0.5	92	2 metre of PDEAS on gas Chromosorb Q 80—100 mesh at 140°C and 20 p.s.i., PND in the 'P' mode at 650°C, injector temperature at 200°C.	
Cabbage	Dichlorvos	0.4	58	2 metre of 2% PDEAS on Gas Chromosorb Q 80—100 at 140°C and 20 p.s.i. PND in the 'P' mode at 650°C, injector temperature at 200°C.	
Tomatoes	Dimethoate	0.5	104	2 metre of 3% Apiezon L + 0.2% Epikote 1001 on gas Chromosorb W-HP 80—100 mesh at 195°C and 22.5 p.s.i., PND in the 'P' mode at 650°C, injector temperature 225°C.	
Beans ...	Dimethoate	0.5	74.4	same column and conditions	
Cabbage	Dimethoate	0.4	86.6	same column and conditions	
Giant Chillies	Dimethoate	0.5	83	same column and conditions	
Petsai ...	A — Endosulfan	0.4	93	2 metre of 5% QF1 on Chromosorb W-HP 80—100 mesh at 195°C and 26 p.s.i., ECD, injector/detector temperature at 225°C.	
Cabbage	B — Endosulfan	0.4	106		
	A — Endosulfan	0.4	80	same column and conditions	
	B — Endosulfan	0.4	102	same column and conditions	

10.13.4 4 samples of water were received from the Camarons Hatchery Co. Ltd. for the analysis of pesticides residues. BHC and DDT were detected at a very low level.

10.14. *Visitors*

(i) In May Mr. Snapes, Perkin Elmer's engineer, set up the F 17 gas Chromatograph.

(ii) In May/June, Mr. Wood, the Pesticide Analyst from Tropical Products Institute, gave some training to the staff in the gas Chromatographic techniques for measuring pesticide residues in crops.

(iii) In November, Mr. Hogge, Pye Unicam's engineer, repaired the SP 1900 Atomic Absorption Spectrophotometer for measuring the minor elements in tea leaves, e.g. zinc, copper, calcium, boron and so on.

10.15 *New Laboratory*

The building for our new laboratory was completed in December 1977. Removal started in January 1978 and lasted for two months. The Agricultural Chemistry Division occupies the first and second floors of the building.

The following table shows the number of samples analysed during the year 1977:

TABLE 10.16

<i>Samples</i>	<i>No. of samples analysed</i>
Soil from small planters	28
Soil in connection with various experiments ...	328
Soil from various sources	46
Fertilizers	17
Compost or manure	5
Water	19
Tea Leaves	457
Sugarcane leaves	144
Cattle manure	109
Raw materials for the manufacture of feeds ...	31
Prepared feeds	40
Local maize	188
Urea/molasses	11
Silage	147
Sugarcane tops and stalks	413
Acacia and faeces	94
Feedlot effluent	35
Grass	324
Groundnut cakes	38
Citrus species	57
Miscellaneous	78

XI. Animal Production Division

HEAD OF DIVISION : C. DELAITRE, DIVISIONAL SCIENTIFIC OFFICER

11.1 The work of the Division consisted in advising the Livestock Breeding Stations on proper livestock husbandry methods and undertaking research in the nutrition of cattle, pigs and goats. In this respect Dr. T. R. Preston continued to act as Consultant to the Animal Production Division with special emphasis on the use of sugar cane and its by-products as animal feed and to devise new farm buildings suited for the purpose.

11.2. The Divisional Scientific Officer continued to be in charge of formulating rations at the Livestock Feed Factory. He acted as Principal Agricultural Officer on two occasions, namely from 29.6.77 to 13.7.77 and from 7.11.77 to 30.11.77. Mr. Delaitre retired in December.

11.3. Mr. Hulman left for reading University in July to complete his M. Phil thesis. Mr. L. K. Ma Poon was acting as Divisional Scientific Officer from November.

11.4. During 1977 the construction of the two dairy feedlots (one at Palmar Livestock Breeding Station and one at Richelieu Breeding Station) was in progress and it is expected that the work will be completed by January/February 1978.

11.5. Meanwhile the 270 heifers received in 1976 under the project Milk Production and Processing were housed at Richelieu Livestock Breeding Station. They were divided into 4 groups for breeding purposes. One group of heifers was to be inseminated with Friesian semen, the second group with Creole, the third with Sahiwal and the fourth with Simmental as soon as they would reach breeding age. By the end of 1977, 34 crossbred Friesian calves, 20 crossbred Creole calves and 7 crossbred Sahiwal calves were born. No crossbred Simmental calves were born in 1977. The average birth weight of the crossbred Friesian, Creole and Sahiwal calves were respectively 25.5, 26.6 and 26.2 kg.

11.6. The Officers of the Division continued to advise the Livestock Breeding Stations on husbandry problems. Scientific Officer Mr. Ma Poon looked after Curepipe Livestock Breeding Station; Scientific Officer Mr. Boodoo was responsible for Richelieu Livestock Breeding Station and Scientific Officer Mr. Gaya was attached to Palmar Livestock Breeding Station.

11.7. *Research Work*

SCIENTIFIC OFFICER : MR. HULMAN

11.7.1. *The apparent dry matter digestibility of acacia*

Mr. Hulman undertook 2 *in-vivo* dry matter digestibility determinations of acacia (*Leucaena leucocephala*) using 4 Anglo-Nubian male goats. Digestibility crates were built and the determinations (20.1.77 to 11.2.77) were carried out at Palmar Livestock Breeding Station.

Results

The results of the determinations are shown in Tables 11.1. and 11.2.

TABLE 11.1 — DIGESTIBILITY DETERMINATION — 20.1.77 20 11.2.77

1. No. of goats	...	...	...	4
2. Mean initial liveweight (kg)	...	...	...	22.2
3. Mean final liveweight(kg)	...	...	...	20.8
4. Mean dry matter (DM) of acacia (%)	...	...	...	27.8 ± 0.55
5. Mean accacia intake:				
(a) g DM/day	...	...	...	353.1 ± 10.9
(b) g DM/kg liveweight/day	...	...	...	15.9 ± 0.49
(c) g DM/kg liveweight/day	...	...	...	50.3 ± 1.55
6. Mean dry matter digestibility of acacia	...	...	...	0.616 ± 0.039

TABLE 11.2.—DIGESTIBILITY DETERMINATION—4.4.77 TO 23.4.77

1. No. of goats	...	...	...	4
2. Mean initial liveweight (kg)	...	...	...	20.2
3. Mean final liveweight (kg)	...	...	...	91.1
4. Mean dry matter (DM) of acacia (%)	...	...	...	27.2 ± 0.54
5. Mean accacia intake:				
(a) g DM/day	...	...	...	347.8 ± 8.85
(b) g DM/kg liveweight/day	...	...	...	17.2 ± 0.43
(c) g DM/kg liveweight/day	...	...	...	54.4 ± 1.36
6. Mean dry matter digestibility of acacia	...	...	...	0.639 ± 0.034

The dry matter in acacia can therefore be said to be digested to the extent of about 62% *in-vivo*.

11.7.2. *Accacia and groundnut cake as protein sources for beef cattle fed molasses/urea*

From February 1977 Mr. Hulman undertook a major feeding trial at Richelieu Rehabilitation Centre. The objective was to compare acacia (*Leucaena leucocephala*) and groundnut cake as sources of proteins in beef cattle diets containing high levels of molasses/urea. At the same time the objective was to find the optimum amount of acacia that would maximize liveweight gain and molasses intake.

11.7.3. *Materials and Methods*

5 dietary treatments were compared in a randomised block design with 6 replicates. Bulls of 1—2 years of age were used. The treatments were:—

- (a) Fresh acacia at 2% live weight ... (ad lib. acacia)
 (b) *Ad libitum* fresh acacia ... (2% acacia)
 (c) Fresh acacia at a level midway between (a) and (b) ... (mid acacia)
 (d) Groundnut cake and bagasse to supply the same amount of CP (crude protein) and CF (crude fibre) as the 2% acacia treatment ... (2% GNC)
 (e) Groundnut cake and bagasse to supply the amount of CP and CF as the *ad lib.* acacia treatment ... (ad lib. GNC)

These treatments were supplements to a basal diet of *ad lib.* molasses (78° Brix) containing 3% urea (46% N), *ad lib.* mineral mixture containing equal parts of dicalcium phosphate and sodium chloride and *adlib.* water.

Results. The results are shown in Table 11.3.

TABLE 11.3

AVERAGE DAILY GROWTH RATE AND FEED INTAKE OF BULLS FED ACACIA OR GROUNDNUT CAKE

		Acacia			Groundnut cake		Standard error of difference
		2%	Mid	Ad lib.	2%	Ad lib.	
No. of animals	...	6	5	5	5	5	
Initial weight (kg)	...	159.5	181.8	163.0	172.3	156.5	± 15.08
Final weight (kg)	...	231.5	243.7	245.8	219.0	216.5	
Daily gain (kg)	...	0.791	0.737	0.848	0.595	0.744	± 0.076*
Feed intake DM/day—							
Total (kg)	...	6.71	7.24	8.02	5.10	6.89	± 0.47***
Molasses (kg)	...	5.30	4.95	5.04	3.74	3.61	± 0.39***
Acacia/grass (kg)/l	...	1.17	2.21	2.83	0.92	2.11	—
g, DM/kg liveweight	...	34.3	34.0	39.2	26.1	36.9	± 1.9***
Molasses/kg liveweight (g, DM)	...	25.6	24.1	24.4	20.6	19.0	± 1.55***
Molasses as % of total DM	...	78.9	68.1	62.0	73.1	53.0	± 1.91***
CF intake (kg)	...	0.330	0.666	0.798	0.343	0.787	—
N × 6.25 intake (kg)	...	1.16	1.31	1.44	0.88	1.17	± 0.98***
Intake of fresh acacia (% liveweight)	...	2.0	3.5	4.6	—	—	

MJ — Mega Joules

*P < 0.05

**P < 0.01

***P < 0.001

Figures for liveweight gains, feed intake and feed conversion have been adjusted for differences in initial weight by covariance analysis.

Statistical analyses were done with 4 missing values.

1—Animals receiving groundnut cake were fed *Ischaemum aristatum* as a source of roughage.

11.7.4. It is suggested that for maximising liveweight gains and molasses intake the feeding rate of fresh accacia be 2% of liveweight/day. Since intake of CP was not equal in the treatments 2% accacia, 2% GNC and *ad lib* accacia, *ad lib* GNC, accacia and GNC cannot be strictly compared. However, there is an indication that ground cake decreases intake of molasses (Table 11.3).

The *in-vivo* digestibilities and the trial with accacia and groundnut cake formed part of the M. Phil. Thesis of Mr. Hulman.

11.8.0. SCIENTIFIC OFFICER: MR. GAYA

11.8.1. *Performance Testing of goats*

The aim was to assess the individual performance of the male goats at Palmar livestock Breeding Station for breeding purposes on the breeding station or for sale to breeders through the Extension Services.

50 male goats were performance tested for a period of 126 days. The diet of the animals consisted of *ad lib.* fodder with 0.5 kg cow feed/40 kg liveweight.

At the end of the trial 5 goats were kept at Palmar Livestock Breeding purposes, 34 were sold to breeders and 11 were culled.

11.8.2. *Effect of restricted suckling on incidence of mastitis in cow and growth rate of calves.*

The effects of rearing calves by restricted suckling or by the traditional method (bucket feeding) were investigated at Palmar Livestock Breeding Station and Curepipe Livestock Breeding Station where 16 Friesian cross-bred and 20 Creole cows respectively, were used. Emphasis was laid on incidence of mastitis in the dams and the growth rate of the calves.

The diet of the cows was 40 kg fodder/head/day supplemented with 5 kg cow feed for the first 7 days after parturition. Afterwards cowfeed supplementation was at the rate of 1.3 kg for maintenance together with 0.3 kg for every litre of milk produced.

As from the 10th day after birth suckling calves were allowed molasses containing 5% urea *ad lib.*, 0.1 kg fish meal and 0.2 kg ground maize/head/day.

The bucket-fed received 1 kg/head milk on the first day. This was increased by 0.5 kg/head every day until each calf was consuming 4 kg by the seventh day. From the third the calves were given calf feed in addition to the milk and the feeding scheduled is outlined below:—

3rd and 4th week ...	4 kg milk + 0.125 kg calf feed/head/day
5th and 6th week ...	4 kg milk + 0.25 kg calf feed/head/day

7th and 8th week ...	4 kg milk + 0.375 kg calf feed/head/day
9th and 10th week ...	4 kg milk + 0.5 kg calf feed/head/day
11th and 12th week ...	4 kg milk + 0.625 kg calf feed/head/day

In the 13th week the milk was decreased by 0.5 kg/head/day until the calf was weaned and at this time the calf feed consumption was raised to 0.75 kg.

At Palmar Livestock Breeding Station once a day (morning) milk was done. In the afternoon no milk was done but calves were allowed to suckle. Suckling calves were allowed to suckle their dams 30 minutes after milking. At Curepipe Livestock Breeding Station twice a day (morning and afternoon) milking was done. Weaning was done when the calves were 90 days old.

11.8.3. Results

Tables 11.4 and 11.5 summaries the results for Palmar Livestock Breeding Station respectively.

TABLE 11.4

OBSERVATIONS ON THE RESTRICTED SUCKLING OR THE
TRADITIONAL METHOD OF CALF REARING AT
PALMAR LIVESTOCK BREEDING STATION

			<i>Restricted suckling</i>	<i>Traditional method</i>
No of calves ...	...	...	8	8
Liveweight (kg)—				
At Birth ...	...	...	26.6 ± 4.6	26.9 ± 2.2
At Weaning ...	...	...	71.3 ± 11.7	58.6 ± 5.2
Average daily gain ...	...	...	0.497 ± 0.273	0.353 ± 0.043
Age at weaning (days) ...	...	...	90	90
Total milk consumption (kg)				
(6 — 90 days) ...	...	...	336.15 ± 28.1	332
Milk consumption per day (kg)	...	...	3.955 ± 0.331	3.91
Total molasses consumed (kg)				
(5 — 90 days) ...	...	...	41.79 ± 9.08	
per day (kg) ...	...	...	0.55 ± 0.12	
Total maize + fish meal (kg)				
(10 — 90 days) ...	...	...	11.63 ± 1.57	
per day (kg) ...	...	...	0.144 ± 0.019	
Calf feed (kg)				
(15 — 90 days) ...	...	...		61.5
per day (kg) ...	...	...		0.81
Conversion				
kg milk/kg weight gain ...	...	...	7.96	11.08
No. of cows ...	...	...	8	8
Total milk drawn till weaning (kg)				
(6 — 90 days) ...	...	...	382.7 ± 90.2	
per day (kg) ...	...	...	4.5 ± 1.06	
Milk suckled by calves till weaning (kg) ...	...	...	330.1 ± 29.07	
per day (kg) ...	...	...	3.96 ± 0.34	
Total milk produced (kg)				
(6 — 90 days) ...	...	...	712.8 ± 103.6	420.2 ± 69.7
per day (kg) ...	...	...	8.39 ± 1.2	4.94 ± 0.82
Milk for sale (kg)				
(6 — 90 days) ...	...	...	376.7 ± 95.7	88.18 ± 69.7
per day (kg) ...	...	...	4.43 ± 1.12	1.04 ± 0.82
Quarters affected by clinical mastitis on % basis ...	...	...	3	3
Quarters affected:				
(a) Both clinical & sub-clinical mastitis ...	...	...	65	82.4
(b) Sub-clinical mastitis ...	...	...	61.7	80.6

Means are quoted with standard deviations.

TABLE 11.5

OBSERVATIONS ON THE RESTRICTED SUCKLING OR THE
TRADITIONAL METHOD OF CALF REARING AT
CUREPIPE LIVESTOCK BREEDING STATION

				<i>Restricted suckling</i>		<i>Traditional method</i>	
No. of calves	...	...	...	10		10	
Liveweight (kg)							
At Birth	...	...	...	30.7	± 2.8	30.4	± 3.6
At Weaning	...	...	...	59.2	± 13.5	69.4	± 7.3
Average daily gain (kg)	...	...	...	0.3166	± 0.048	0.4333	± 0.067
Age at weaning (days)	...	...	...	90		90	
Total milk consumption (kg)							
(0 — 90 days)	...	...	...	253.8	± 86.1	342	
per day (kg)	...	...	...	2.82	± 0.95	3.8	
Total molasses consumed (kg)							
(15 — 90 days)	...	...	...	18.6	± 6.8		
per day	...	...	...	0.245	± 0.08		
Calf feed (kg)							
(15 — 90 days)	...	...	...			61.5	
(per day)	...	...	...			0.81	
Conversion							
kg milk/kg weight gain	...	...	...	8.91		8.77	
No. of cows	...	...	...	10		10	
Liveweight (kg)							
Just after calving	...	...	...	368.5	± 26.1	362.3	± 36.9
At weaning	...	...	...	343	± 26.1	334.6	± 30.7
Average daily loss	...	...	...	— 0.284	± 0.086	— 0.308	± 0.053
No. of cows	...	...	...	10		10	
Total milk drawn till weaning (kg)							
(0 — 90 days)	...	...	...	673.4	± 215.1		
per day (kg)	...	...	...	7.48	± 2.38		
Milk suckled by calves till							
weaning (kg)	...	...	...	226.5	± 90.8		
per day (kg)	...	...	...	2.81	± 1.12		
Total milk produced (kg)							
(0 — 90 days)	...	...	...	899.9	± 152.7	749.7	± 129.9
per day (kg)	...	...	...	10.0	± 1.7	8.33	± 1.44

TABLE 11.5

				<i>Restricted Suckling</i>	<i>Traditional Method</i>
Milk for sale (kg)					
(0 — 90 days) ...	...	...	...	646.2 ± 214.5	407.7 ± 129.9
per day (kg) ...	...	...	...	7.18 ± 2.3	4.53 ± 1.4
Quarters affected by clinical mastitis on					
% basis ...	...	...	...	0	2
Quarters affected:					
(a) Both clinical & sub-clinical mastitis				69.39	73.68
(b) Sub-clinical mastitis ...	...	...	...	63.39	73.3

Means are quoted with standard deviations

Figures 11.1. and 11.2. show the growth rate of the calves at Palmar Livestock Breeding Station and Curepipe Livestock Breeding Station respectively.

11.8.4. In the traditional method the calves grew at a significantly higher rate than in the restricted suckling method at Curepipe Livestock Breeding Station but at Palmar Livestock Breeding Station the suckling calves had a better performance. However, by adopting restricted suckling it appears that more milk is available for sale than by adopting the traditional method. However, the incidence of mastitis in suckled dams is much less than in dams not suckled by their calves.

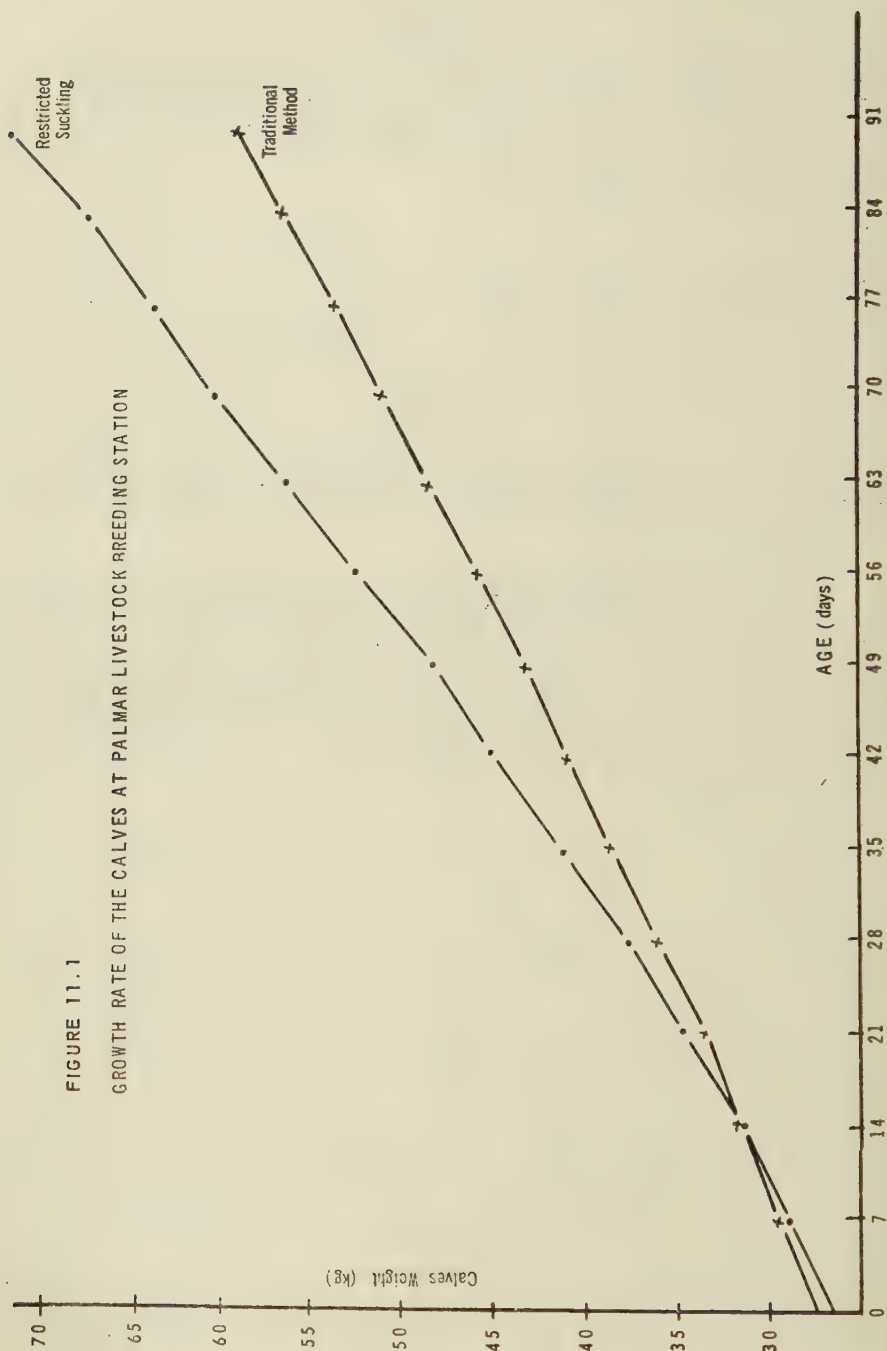
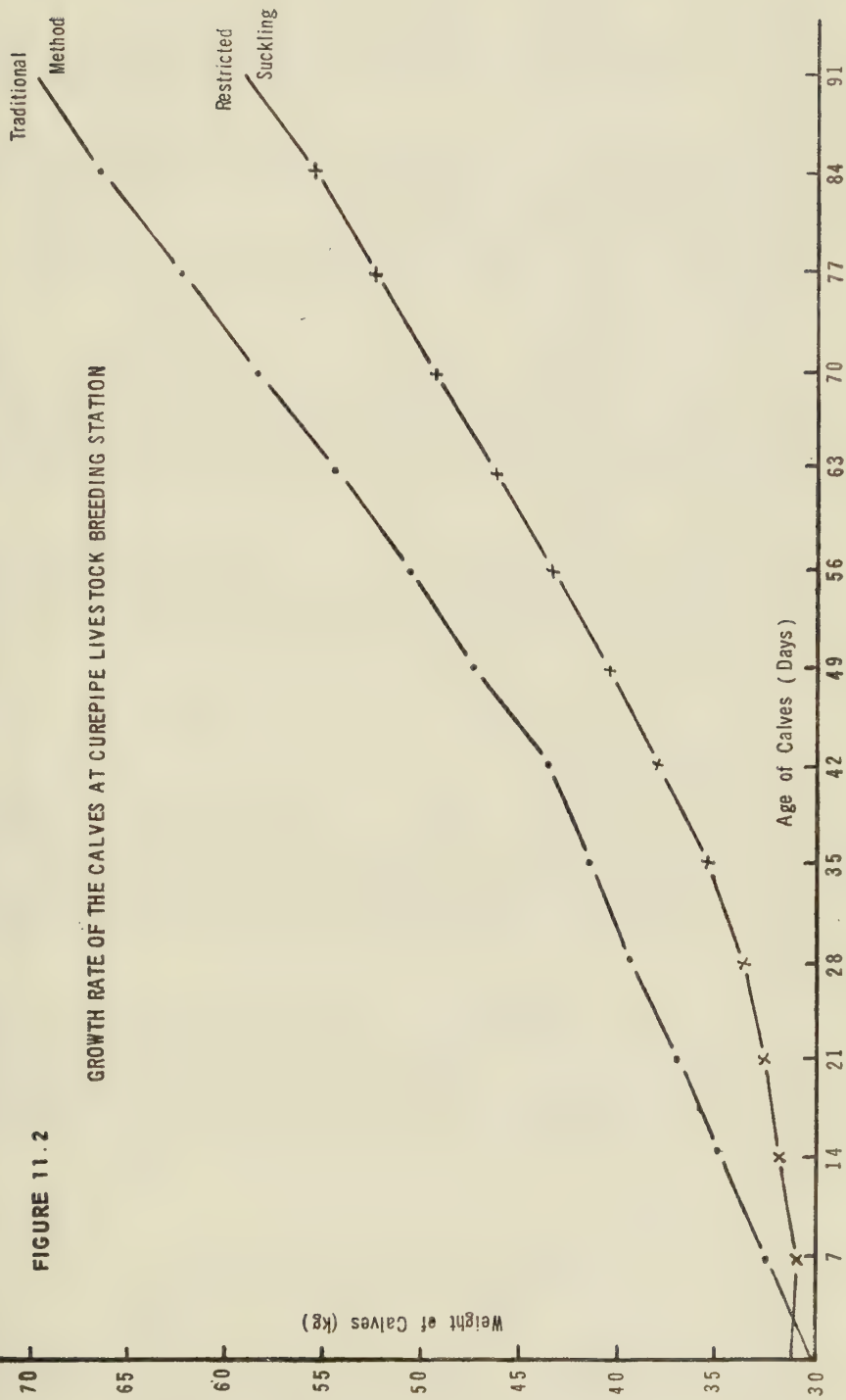


FIGURE 11.2

GROWTH RATE OF THE CALVES AT CUREPIPE LIVESTOCK BREEDING STATION



11.9. SCIENTIFIC OFFICER — MR. A. BOODOO

11.9.1. *Variation in the composition of sugarcane grown on the wet up-lands areas in Mauritius*

The effect of age and rainfall on the nutritive value of the sugarcane grown at Mon Bois (Forest Side) was investigated from May 1977. The following data were collected every month:

- (1) Proportions (by weight) of cane top to cane stalk (fresh basis);
- (2) The dry matter in the cane top and the cane stalk;
- (3) The brix in the juice of the cane stalk.

Four fields (2 planted with the variety M 351/57 on 26.1.76 and 2 planted with the variety M 93/48 on 16.2.76) were selected. In each of the field a plot of size 15×20m was taken at random. Every time 8 canes were harvested at random from each field and brix, dry matter and weight of cane stalk and cane top were determined.

The results as at December 1977 are summarised in Table 11.6. The cane stalks are about 5 times as heavy as the cane tops. Rainfall appears to effect the dry matter content of the whole sugar cane more than the brix. Cattle at Richelieu Livestock Breeding Station are consuming whole from Mon Bois since October 1977.

11.9.2. *Use of cattle effluent for production of methane (biogas). Effect of different retention times*

It is felt that methane produced from cattle effluent (slurry) can be a good source of energy on a farm, e.g. fuel for tractors and for lighting purposes etc. Since there are no data on the rate of gas production per unit dry matter of slurry, a trial was undertaken to measure the production of methane at Richelieu Livestock Breeding Station. Two 44-gallon, polythene-lined drums were used as digestors. Gas was collected by displacement of water.

The object of the experiment was to evaluate the effect of a 10-day retention time in the continuously-fed digestors operation on slurry from cattle fed sugarcane and its by-products. The digestors were filled to approximately 90% of their capacity. The 10-day retention time was obtained by adding daily (during 10 successive days) fresh slurry at 10% of the capacity of the digester.

11.9.3. *Results*

The average gas production was 45 litres per day. This is equivalent to about 50 litres per kg total effluent dry matter.

However, since gas production depends on the dry matter content of the effluent (low dry matter content resulted in low gas production) it is proposed to increase the dry matter of the effluent by the addition of bagasse. The effect of a longer retention time is also to be investigated.

TABLE 11.6

COMPOSITION OF SUGARCANE GROWN AT MON BOIS

Months	Rainfall (mm)	Field 1 M 351/57					Field 2 M 351/57					Field 3 M 93/48					Field 4 M 93/48				
		Wt. (kg) stalk	Wt. (kg) Top	Wt. (kg) stalk	DM (%) Top	DM (%) stalk	Brx stalk	Wt. (kg) Top	Wt. (kg) stalk	DM (%) Top	DM (%) stalk	Brx stalk	Wt. (kg) Top	Wt. (kg) stalk	DM (%) Top	DM (%) stalk	Brx stalk	Wt. (kg) Top	Wt. (kg) stalk	DM (%) Top	DM (%) stalk
May ...	227.1	14.0 ±	0.53 ±	1.61 ±	26.73 ±	24.97 ±	14.16 ±	0.48 ±	1.50 ±	26.33 ±	26.27 ±	13.50 ±	0.49 ±	1.61 ±	21.67 ±	25.40 ±	12.36 ±	0.31 ±	1.71 ±	22.10 ±	23.35 ±
June ...	146.1	12.64 ±	0.04 ±	0.11 ±	1.28 ±	2.26 ±	0.33 ±	0.04 ±	0.12 ±	0.98 ±	1.12 ±	0.35 ±	0.04 ±	0.09 ±	1.90 ±	2.20 ±	0.63 ±	0.03 ±	0.20 ±	3.00 ±	2.15 ±
July ...	188.7	12.51 ±	0.38 ±	1.93 ±	24.73 ±	23.95 ±	14.14 ±	0.38 ±	1.47 ±	25.80 ±	27.35 ±	13.18 ±	0.51 ±	1.87 ±	23.58 ±	24.45 ±	13.21 ±	0.53 ±	2.00 ±	23.90 ±	26.30 ±
Aug.	170.7	14.64 ±	0.27 ±	1.57 ±	27.85 ±	28.85 ±	14.83 ±	0.27 ±	1.42 ±	30.00 ±	29.30 ±	14.63 ±	0.46 ±	1.78 ±	23.45 ±	27.35 ±	13.38 ±	0.51 ±	1.66 ±	22.65 ±	25.55 ±
Sept. ...	126.614.37 ±	0.36 ±	0.03 ±	0.11 ±	1.50 ±	1.45 ±	0.30 ±	0.02 ±	0.11 ±	1.70 ±	0.50 ±	0.27 ±	0.04 ±	0.13 ±	1.25 ±	1.50 ±	0.40 ±	0.04 ±	0.16 ±	1.25 ±	3.50 ±
Oct. ...	127.5	14.37 ±	0.23 ±	1.50 ±	30.40 ±	28.86 ±	15.43 ±	0.16 ±	1.33 ±	29.00 ±	28.90 ±	14.75 ±	0.37 ±	1.75 ±	24.27 ±	27.80 ±	13.81 ±	0.28 ±	1.60 ±	24.17 ±	24.77 ±
Nov. ...	76.6	0.30 ±	0.03 ±	0.13 ±	1.80 ±	1.60 ±	0.31 ±	0.02 ±	0.11 ±	1.50 ±	1.60 ±	0.28 ±	0.03 ±	0.15 ±	1.30 ±	0.91 ±	0.31 ±	0.04 ±	0.10 ±	1.42 ±	0.64 ±
Dec. ...	407.2	HARVESTED	HARVESTED	HARVESTED	HARVESTED	HARVESTED	HARVESTED	HARVESTED	HARVESTED	HARVESTED	HARVESTED	HARVESTED	HARVESTED	HARVESTED	HARVESTED	HARVESTED	HARVESTED	HARVESTED	HARVESTED	HARVESTED	HARVESTED
		19.85 ±	0.25 ±	1.35 ±	32.05 ±	28.30 ±	10.89 ±	0.35 ±	1.26 ±	25.65 ±	27.30 ±	20.28 ±	0.35 ±	1.26 ±	25.65 ±	27.30 ±	20.28 ±	0.30 ±	1.88 ±	28.10 ±	26.55 ±
		0.44 ±	0.04 ±	0.13 ±	2.25 ±	2.25 ±	0.24 ±	0.04 ±	0.13 ±	1.65 ±	0.90 ±	0.29 ±	0.03 ±	0.13 ±	1.65 ±	0.90 ±	0.29 ±	0.03 ±	0.13 ±	2.60 ±	0.65 ±
		20.01 ±	0.46 ±	2.13 ±	27.65 ±	26.95 ±	18.97 ±	0.54 ±	2.34 ±	24.70 ±	28.60 ±	0.54 ±	0.06 ±	0.14 ±	0.60 ±	0.90 ±	0.54 ±	0.06 ±	0.14 ±	0.60 ±	0.90 ±

Means are quoted with standard errors. Each figure is an average of 8 individual figures.

11.10.0 SCIENTIFIC OFFICER — MR. L. K. MA POON

11.10.1. *Establishment of input-output coefficients and determination of optimum amounts of supplementation for intetfrated milk/beef units fed on sugarcane and its by-products*

The aim of this trial is to study the level of supplementation in the milk/beef feedlot of Richelieu Livestock Breeding Station and thereby to establish the optimum supplementation rates during complete production cycles.

Materials and Methods

5 treatments with 2 replicates are being used to evaluate the effect on milk production of a dairy feedlot supplement (wheat bran 50%, maize 30% and groundnut cake 20%) given to cows receiving a basal diet of *ad lib.* chopped sugarcane, *ad lib.* molasses containing 5% urea and *ad lib.* mineral mixture. The levels of supplementation are 1.5, 2.0, 2.5, 3.0 and 3.5 kg dairy feedlot supplement/head/day.

Groups of 16 cows are randomly allocated to each treatment as soon as they calve. The trial started on 8.10.77, but as sufficient pens were not available at the time only one treatment (2.0 kg dairying feedlot supplement) was set up. Records of feed intakes of cows and calves, milk production of the cows and liveweight changes of cows and calves are being kept.

11.10.2. *Performance testing of bulls at Richelieu Livestock Breeding Station*

Bulls which are offsprings of good milking dams are performance tested for liveweight gains before they are used for breeding purposes. Initially 20 Creole or Creole x Friesian bulls were chosen to undergo performance testing at Richelieu Livestock Breeding Station. 10 of the bulls were subsequently culled because of their poor performance, and the rest completed the test. The animals received fodder at the rate of 3% body weight per day and cow feed *ad lib.* Mineral mixture was also provided *ad lib.*

11.10.3. *Results*

The results (Table 11.7.) do not include data for feed consumption and conversation because individual feeding facilities were not available. Table 11.7 shows the performance of the animals as at 10.12.77.

TABLE 11.7

Tag No.	Initial of birth	Weight weight 14.5.77	Total on 10.12.77	gain (kg)	A.D.G. (gm)	Age (days)	Wt./age	
497	... 3.	9.76	100	307	207	986	463	0.6630
721	... 10.12.76	84	303	219	1043	335	0.9045	
701	... 1.	2.76	155	353	198	943	677	0.5214
725	... 8.	7.76	138	337	199	948	520	0.6480
703	... 29.	1.76	160	368	208	990	680	0.5411
718	... 6.	8.76	133	362	229	1090	491	0.7372
500	... 20.	3.76	156	354	198	943	630	0.5619
726	... 20.	7.76	149	346	197	938	508	0.6811
720	... 2.	4.76	143	381	238	1133	617	0.6175
715	... 27.	4.76	180	424	244	1162	592	0.7162

In view of their performance, bulls 715, 718 720 and 721 could be made available for breeding purposes.

11.9 Visits

During the year, the Animal Production Division received the visits of:—

1. Professor C. R. W. Spedding ... University of Reading, England
2. Professor Shraber ... Wye College, University of London
3. Professor R. Dumont ... France
4. Mr. F. Vandemeale ... Senior Technical Advisor, UNDP
5. Mr. J. Renaud ... Dairy Technology Officer, FAO
6. Mr. M. Chenost ... Animal Nutrition Officer, FAO

XII. Animal Health Division

HEAD OF DIVISION: DR. F. MOSAHEB, PRINCIPAL VETERINARY OFFICER

12.1. During the year 1977 the Animal Health Division was responsible for the following activities: Artificial Insemination services to cowkeepers and to Government Livestock Breeding Stations, Health of animals on Government Stations and in the field, the running of the Animal Health Laboratory and enforcement of the Animal Disease Ordinance through quarantine of both large and small animals and issue of import permits and veterinary certificates.

ARTIFICIAL INSEMINATION SERVICES

12.2. Semen for Friesian and Creole bulls was regularly collected at the Artificial Insemination Centre and was used in the liquid state to inseminate cattle. Pursuing the policy of the Ministry, animals in Moka and upper Plaines Wilhems were inseminated with Friesian Semen while the rest of the island was supplied with Creole Semen. 150 doses of frozen Simmental Semen were imported from South Africa to inseminate heifers which were brought from New Zealand. During the year a total of 7,058 inseminations were carried out. The average conception rate with liquid semen was about 70.4%.

ANIMAL HEALTH

12.3. *Brucellosis*

As a result of a survey on Bovine Brucellosis which was carried out in certain parts of the island, six positive cases were observed. The affected animals were disposed of through slaughter and the premises disinfected. One sugar estate in the South which was infected was retested after the disposal of the positive cases and negative results were obtained. These results were later confirmed by the Veterinary Services of Reunion Island.

12.4. *Contagious Ecthyma-Orf*

A few cases of suspected "Orf" (Contagious Ecthyma) in goats were seen around Bambous and Pointe aux Sables areas. This disease being self limiting in most cases, it did not warrant special control measures. No new case was reported afterwards.

12.5. Bovine Infectious Keratoconjunctivitis (Pink Eye) which are present at Palmar and Richelieu Breeding Stations has been successfully controlled at Richelieu but attempts to reduce the incidence at Palmar are still continuing through treatment of the affected animals and keeping the fly population low by regular spraying and fogging.

12.6. *Streptothricosis (Dermatophilosis)*

An outbreak of Dermatophilosis occurred at Mont Desert Mon Tresor among calves which were purchased from small cowkeepers and kept for fattening. All the 24 animals which were affected were successfully treated by the staff of the Division.

12.7. *Bovine Tuberculosis*

Under the Bovine Tuberculosis eradication programme, 1,810 animals from Government Stations and Sugar Estates were tested. 16 positive cases were detected giving a percentage of 0.7%. These animals were disposed of through slaughter as usual.

12.8. *Mastitis*

A survey on bovine mastitis with the aim to establish proper control measures was started and is still continuing.

12.9. *Veterinary Aid*

In addition to cases attended on Government Stations, 5,080 cases requiring veterinary aid were attended in the field. These included 848 cases of mineral deficiencies, 543 cases of calving difficulties and 593 cases of mastitis.

12.10. *Cage Birds*

The cage birds kept at the aviaries at Cascavelle and Rivière Noire also benefitted from the services of Veterinary Officers.

12.11. *Legislation on Animal Diseases*

With the aim of the Ministry to eradicate Bovine Tuberculosis and Brucellosis, legislation is being passed to compensate owners whose animals would be sent for slaughter as a result of the above diseases.

ANIMAL HEALTH LABORATORY

12.12. The Animal Health Laboratory was concerned with:—

- (a) general diagnostic work;
- (b) vaccine production;
- (c) sterilisation of livestock products; and
- (d) preparation of some medicinal solutions.

12.13. *General Diagnosis*

A total of 3,019 specimens were submitted to the Laboratory for pathological, bacteriological, parasitological, biochemical and haematological examinations. These included live animals, animal carcasses, blood, milk, swabs, stool samples and skin scrapings and were submitted by Government Stations, private owners and police authorities.

12.14. *Vaccine Production*

The following poultry vaccines were produced:—

<i>Type</i>		<i>No. of doses produced</i>	<i>No. of doses sold</i>
Newcastle Disease Vaccine	...	279,400	117,101
Fowl Pox Vaccine	...	120,075	120,000

The poultry vaccinators of the Animal Health Laboratory carried out vaccinations for backyard poultry keepers and at the same time helped the latter by providing basic advice on poultry management.

12.15. As a contribution towards the assistance to cowkeepers in connection with cases of bovine papillomatosis, the Laboratory Staff collected 31 warts from the field and prepared autogenous vaccines which were later inoculated into the affected animals. The results of these vaccinations were very encouraging.

12.16. *Sterilisation of Livestock Products*

1,674 specimens including raw hides articles, stuffed animals and animal skins were submitted to the Laboratory where they were sterilised prior to release.

12.17. *Preparation of Medicinal Solutions*

Some medicinal solutions including calcium borogluconate and potassium iodide solution which were either lacking on the market or which were very costly were prepared in the laboratory and given free of charge to needy cowkeepers.

12.18. *Enforcement of Animal Disease Ordinance*

To maintain the low incidence of animal diseases in the country, the provision of the Animal Disease Ordinance were rigidly applied to all imports of animals and animal products. The quarantine kennels, the catteries, both at Reduit and the MSPCA Rose Hill, the poultry quarantine unit at Reduit and the Animals Quarantine Station at Roche Bois were maintained. To ensure against the introduction of diseases through the importation of live bullocks and goats from Australia, the slaughter of these animals were restricted to the slaughter houses at Roche Bois, Rose Hill and Curepipe which are under the control of fully qualified veterinary surgeons.

12.19. *Importation of Live Animals*

41 ships and 30 aircrafts bringing live animals were cleared by the Veterinary Officers and all the animals including cage birds and pets were quarantined at the various stations. The imports have been follows:—

<i>Country of origin</i>	<i>Bullocks</i>	<i>Sheep</i>	<i>Goat</i>	<i>Pigs</i>
Somalia ...	... 500			
Australia ...	... 562	932	100	
South Africa	... 3	46		
Rodrigues	... 334		6,292	2,672
Seychelles	...			12
Reunion	...			5

In addition to the above 34 dogs, 10 cage birds, 2 horses, 1 cat and 21,734 poultry birds including 20,645 day old chicks were received from various countries.

12.20. *Livestock Products*

During the year 2,152 import and 653 landing permits were issued. All frozen meat and meat products landed were subjected to veterinary inspection at various cold storages prior to release. The list of imports has been as follows:—

<i>Products</i>	<i>Quantity</i> kgs
Frozen beef and beef products ...	... 4,995,561
Frozen mutton, offals and preparations	... 2,399,077
Frozen goat meat and offals ...	... 196,033
Frozen pork and pork products	... 210,464
Frozen poultry (Turkeys and ducks)	... 70,841
Livestock feeds (poultry, pig dog, rabbit, pheasant, horse and ducks) ...	... 16,926,560

12.21. *Slaughter House Data*

During the year 2,243 calves, 3,109 unproductive cows and 2,019 bulls of the milch breed were slaughtered, producing 844,002 kgs of beef. In addition, 1,606 herd cattle and 399 bullocks imported from Rodrigues were slaughtered yielding 252,707 kgs of beef. 85 bullocks imported from N. Zealand, 298 from Somalia and 527 from Australia were slaughtered and produced 160,531 kgs of beef.

12.22. Likewise, 29,643 kgs of mutton and 186,395 kgs of goat meat was produced in Mauritius and another 7,443 kgss from 309 imported goats and sheep giving a total of 223,480 kgs. 606,174 kgs of pork were produced in the country, including pigs imported from Rodrigues. In these figures, offals and preparation are not included.

12.23. Average weight of imported and local cattle:

Local herd cattle	...	...	$(199,390 \div 1,606) = 124$ kgs
Local milch cow	...	...	$(387,070 \div 3,109) = 124$ kgs
Local bulls of milch breed	...	...	$(230,389 \div 2,019) = 114$ kgs
Calves of local milch breed	...	...	$(226,543 \div 2,243) = 101$ kgs
Rodrigues cattle	...	...	$(53,317 \div 399) = 133$ kgs
New Zealand cattle	...	...	$(12,226 \div 85) = 143$ kgs
Somalia cattle	...	...	$(35,533 \div 298) = 119$ kgs
Australian cattle	...	...	$(112,772 \div 527) = 213$ kgs

12.24. *Slaughter House Control*

From the meat inspection returns, 2 total and 10 partial seizures on account of bovine tuberculosis were reported among 8,977 heads of herd and milch cattle slaughtered during the year, giving an incidence of 0.13% of Tuberculosis.

12.25. In addition to the above, 7 cases of alleged illegal slaughter, 26 casses of alleged cruelty to animals and 12 cases of animals involved in accidents were examined and reports sent to the Police Department.

ADVISORY SERVICES AND LECTURES

12.26. Veterinary Officers continued to visit large and small livestock breeders to provide advice on management. They also lectured to the field staff on Artificial Insemination and minor clinical cases. The Principal Veterinary Officer regularly addressed Village Development Officers and Veterinary Officers gave lectures to students of the School of Agriculture and School of Industrial Technology of the University of Mauritius.

STAFF MOVEMENT

12.27 In connection with importation of cattle from Somalia, the Principal Veterinary Officer proceeded to Somalia in December to study the disease picture in that country.

In April 1977, Veterinary Officer Sibartie was nominated by Government to attend a Conference on Trypanosomiasis which was held in Gambia. In September he was awarded a fellowship from the Government of Australia to follow a short course in Artificial Breeding in Herd Improvement.

RETIREMENT

12.28. Stockman Mootoosamy retired from the service and was replaced by stockman Juglall.

PROMOTIONS

12.29. Mr. A. Matabadul who had been Technical Officer Scientific since 1974 was appointed Laboratory Technologist as from September, 1975.

Mr. Naidoo joined the Animal Health Division in October as Senior Laboratory Attendant.

REVENUE

12.30. Veterinary fees	...	18,063.35	
Sale of Vaccines	...	13,044.00	
Quarantine fees	...	19,590.28	
Adv. a/c: Dogs	...	7,090.04	
Adv. a/c: Dogs	...	NIL	
Import Permits fees	...	2,152.00	
Miscellaneous	...	1,368.75	(Sterilisation, Post Mortem fees, Blood analysis, rent)
Lease of cows	...	118.82	
Sale of Drugs	...	10,306.56	

XIII. Dairy Chemistry Division

OFFICER-IN-CHARGE: J. NG MAN SUN — SCIENTIFIC OFFICER

13.1. During the year 1977, the Dairy Chemistry Division continued its survey of the quality of milk from the creole cows of small cowkeepers, undertook the analysis of milk from the cows at Curepipe and Richelieu Livestock Breeding Stations, the analysis of mastitic milk from cows at Palmar Livestock Breeding Station, the pasteurisation of milk from Curepipe Livestock Breeding Station, as well as some odd analyses from the private sector to which technical advice was also given whenever sought for.

13.2. Survey of quality of milk from creole cows

(SCIENTIFIC OFFICER J. NG MAN SUN AND TECHNICAL OFFICERS S. RAMESSUR, P. PANDAY, AND M. MUDHOO)

13.2.1. The survey is being continued, although it has completed its scheduled three-year run, in order to investigate why, in the light of results already obtained, the percentage of solids-not-fat seems to be invariably low, less than the legal minimum standard of 8.5%, whereas the average percentage of fat appears to be quite reasonable, about 3.7%, which is well above the legal minimum standard of 3%.

Table 13.1 shows the monthly average results for 1977

Table 13.2 shows the fat distribution.

13.2.2. It should be noted that, although the monthly average fat percentage is above 3%, there are still quite a few samples which contain less than 3% fat. In fact, it is found that such samples represent about 25% of the total number.

13.2.3. Besides protein, the other constituents of solids-not-fat in milk, in order of importance quantitatively, are lactose, calcium and phosphorus. Hence, to investigate into the apparently low value of SNF their determination was introduced this year and was done together with the usual determination of fat, protein, density, pH, freezing point, total solids, coliform organism and total bacteria. Chloride, which is present to the extent of about 0.09%, was also determined for the period from June to September when an additional Technical Officer, who is on study leave, was temporarily available.

TABLE 13.1
RESULTS OF SURVEY OF MILK FROM SMALL COWKEEPERS

	Fat %	Protein %	T. Acidity	Density	°C Freezing Point	Total Solids %	Solids-not-fat %	Coliforms/ml	Total Bacteria/ml	pH.	Calcium %	Phosphorus %	Lactose %	Chloride %	No. of samples
January	3.78	3.01	17	28	—0.537	11.49	7.80	1390	139×10^3	6.51	0.112	0.071	—	—	263
February	3.70	2.94	16	27	—0.522	11.56	7.86	1420	306×10^3	6.65	0.115	0.064	—	—	224
March	3.76	2.81	16	28	—0.530	11.68	7.92	2070	267×10^3	6.47	0.123	0.067	4.67	—	373
April	3.72	3.00	16	28	—0.523	11.95	8.23	2640	326×10^3	6.66	0.117	0.072	4.78	—	326
May	4.03	3.08	17	28	—0.511	11.89	7.86	2670	213×10^3	6.69	0.118	0.068	4.34	—	404
June	4.10	3.11	15	27	—0.527	11.96	7.86	2030	208×10^3	6.72	0.124	0.077	4.46	0.096	361
July	3.88	2.87	15	27	—0.525	11.28	7.40	2650	258×10^3	6.75	0.117	0.084	4.43	0.100	359
August	4.23	2.87	15	27	—0.515	11.59	7.36	1550	171×10^3	6.71	0.126	0.091	4.46	0.094	384
September	3.36	2.97	15	28	—0.533	11.62	8.24	1480	260×10^3	6.72	0.110	0.103	4.30	0.094	334
October	3.55	3.04	17	27	—0.519	12.08	8.53	2210	597×10^3	0.113	0.113	0.103	4.25	—	372
November	3.45	2.89	16	27	—0.529	11.87	8.42	2360	284×10^3	6.71	0.118	0.098	4.31	—	217
December	3.50	2.73	16	27	—0.519	11.85	8.35	1760	275×10^3	6.70	0.113	0.096	4.22	—	272

TABLE 13.2
FAT DISTRIBUTION FOR THE YEAR 1977

% Fat	<3.0	3.01-3.30	3.31-3.60	3.61-3.70	3.71-4.20	4.21-4.50	4.51-5.00	>5.00	Total no. of samples
January	56	31	33	24	32	87	—	—	263
February	64	21	26	19	20	17	30	27	224
March	99	33	39	44	32	23	48	55	373
April	61	31	43	40	42	31	35	42	325
May	70	42	26	56	47	39	44	80	404
June	65	29	38	29	40	31	43	86	361
July	83	36	35	32	43	28	44	58	359
August	49	18	16	34	29	40	47	151	384
September	101	44	45	38	39	21	13	24	325
October	99	53	44	53	30	25	34	24	362
November	76	23	23	35	24	7	15	14	217
December	86	25	35	26	28	22	18	32	272
Total	909	386	403	430	407	371	371	593	3872
Percentage	... 23.5	9.96	10.4	11.1	10.5	9.58	9.58	15.3	

no. of samples

TABLE 13.3

PROTEIN DISTRIBUTION FOR THE YEAR 1977

% Protein	...	2.0	2.01-2.30	2.31-2.60	2.61-2.90	2.91-3.20	3.20	Total No. of samples
January	...	2	4	19	82	65	90	262
February	...	—	19	33	70	51	50	223
March	...	3	31	65	113	94	67	373
April ...	...	5	13	29	72	90	117	328
May ...	...	—	21	45	98	99	141	404
June ...	...	—	5	29	95	96	135	360
July ...	...	4	19	59	113	89	67	351
August	...	1	17	77	93	110	87	384
September	...	—	8	42	106	105	64	324
October	...	1	6	28	71	132	125	363
November	...	6	9	36	66	73	27	217
December	...	9	22	71	76	60	33	271
TOTAL	...	31	174	533	1055	1963	1002	3858
Percentage	...	0.77	4.5	13.8	27.3	27.5	25.9	

13.2.4. It would appear from the results in Table 13.1. that the low percentage of solids-not-fat in the milk samples is primarily due to the low values of protein and lactose. Table 13.3. shows the protein distribution and it can be seen that about 50% of the samples contain less than 3% protein. However, before any reliable conclusion can be reached, further and more accurate investigations will have to be carried out.

13.2.5. Firstly, the amount of solids-not-fat will be measured directly instead of being obtained by difference between the amount of total solids and that of fat. For this purpose the Bertuzzi lactometer has been ordered. This is a refractometer capable of reading directly the percentage of dry fat-free residue using the milk itself and not necessarily the prepared fat-free serum.

13.2.6. Secondly, with the availability of the saccharimeter, which has just been received, each and every sample of milk will be analysed for lactose; this will be done not only more accurately but also more rapidly. So far only half of the number of samples were analysed because the chemical method which had to be used was lengthy and required the use of much chemicals.

13.3. *Analysis of milk from Richelieu Livestock Breeding Station*
(TECHNICAL OFFICER — P. PANDAY)

13.3.1. At the request of the Animal Production Division, the analysis of milk from cows at Richelieu Livestock Breeding Station was undertaken. During the first quarter, milk from New Zealand and Sahiwal cows was analysed twice weekly. The results obtained are shown in the table below.

	<i>New Zealand</i>			<i>Sahiwal</i>	
Total Solids	...	...	12.07	12.29	
% Fat	...	...	3.67	3.63	
% Protein	...	...	3.28	3.21	
Titratable Acidity expressed as%					
Lactic acid	...	...	0.16	0.16	
Freezing Point	...	...	—0.535 C	—0.546 C	
Density (corrected to 15 C)	...	...	1.026	1.027	
Coliforms org/ml	...	...	21×10	122×10	
Total Bacteria org/ml	...	...	400×10^3	228×10^3	
% Calcium	...	...	0.126	0.116	
pH	...	...	6.74	6.74	
% Phosphorus	...	...	0.072	0.059	
% Lactose	...	...	4.37	4.33	

13.2.2. During the third and fourth quarters, bulk milk was analysed twice weekly and the results obtained are shown below.

		<i>July</i>	<i>August</i>	<i>September</i>
% Fat	...	4.36	4.36	3.67
% Protein	...	2.52	2.64	2.85
Titratable Acidity	...	0.15	0.16	0.15
Freezing Point	...	—0.542 C	—0.543 C	—0.552 C
% Total Solids	...	11.20	11.48	11.78
Density	...	1.024	1.025	1.026
pH	...	6.67	6.65	6.77
% Calcium	...	0.117	0.127	0.113
% Phosphorus	...	—	0.087	0.106
% Lactose	...	4.55	4.30	4.51
% Chloride	...	—	0.083	0.102
Coliforms org/ml	...	270×10	232×10	209×10
Total Bacteria/ml	...	488×10^3	280×10^3	322×10^3

		<i>October</i>	<i>November</i>	<i>December</i>
% Fat ...	...	3.78	3.21	3.90
% Protein ...	...	2.86	3.06	2.78
Titrateable Acidity ...	...	.17	.17	.16
Freezing Point ...	...	—0.533 C	—0.541 C	—0.538 C
% Total Solids ...	...	11.66	12.73	12.07
Density ...	...	1.027	1.028	1.027
pH ...	...	6.67	6.71	6.71
% Calcium ...	...	0.127	0.126	—
% Phosphorus ...	...	0.116	0.108	—
% Lactose ...	...	4.48	4.42	4.34
Coliform org/ml ...	...	187 × 10	385 × 10	247 × 10
Total Bacteria/ml ...	...	203 × 10 ³	336 × 10 ³	90 × 10 ³

SURVEY OF QUALITY OF MILK FROM MASTITIC COWS AT PALMAR
LIVESTOCK BREEDING STATION (TECHNICAL OFFICER S. RAMESSUR)

13.4. At the request of the Animal Health Division, a survey of quality of milk from both healthy and mastitic cows was carried out at Palmar Livestock Breeding Station during the months of May and June. As can be seen from the results below, mastitic milk differs from healthy cows' milk mainly in its higher chloride content, pH and bacterial count, but lower fat and lactose contents. In certain acute clinical cases of mastitis the milk had a pink taint owing to the presence of blood in it.

			<i>Healthy</i>	<i>Mastitic</i>
% Chloride ...	...	...	0.090	0.133
Total Solids ...	...	...	11.02	10.03
% Fat ...	...	...	3.96	2.54
% Protein ...	...	...	3.39	3.79
Titrateable Acidity ...	...	...	0.16	0.16
Freezing Point ...	...	...	—0.544 C	—0.555 C
Density ...	...	...	1.025	1.026
Coliform org/ml ...	...	...	307	250
Total Bacteria/ml ...	...	...	839 × 10 ³	911 × 10 ³
pH ...	...	...	6.56	6.73
% Calcium ...	...	...	0.144	0.123
% Lactose ...	...	...	4.15	2.26
% Phosphorus ...	...	...	0.066	0.088

MILK PASTEURISATION

13.5. The milk pasteurisation centre has a staff consisting of one Field Assistant and four Livestock Attendants. They are responsible for the collection, cold storage and pasteurisation of the evening and morning milk at Curepipe Livestock Breeding Station. The pasteurised milk is sold to the Ministry of Health. To keep a close control on the pasteurisation, samples of the incoming raw milk and outgoing pasteurised milk are analysed daily. The Dairy Chemistry Division is also responsible for the servicing and maintenance of the equipments in use at the pasteurisation centre. The table below gives typical figures for the amount of milk handled during one month and the results of analyses for the month.

Amount of milk collected from Curepipe Livestock			
Breeding Station (litres)	...	...	9272
Amount pasteurised (litres)	...	...	8703

ANALYSIS : RAW MILK

No. of samples	...	...	23
% Fat	...	...	3.74
% Protein	...	...	3.16
Density (corrected to 15 C)	...	...	1.026
Freezing point	...	...	-0.528 C
Coliform org/ml	...	...	103×103
Total Bacteria /ml	...	...	835×10

ANALYSIS : PASTEURIZED MILK

No. of samples	...	...	22
% Fat	...	...	3.52
% Protein	...	...	3.00
Density (correcte to 15 C)	...	...	1.028
Freezing point	...	...	-0.532 C
Coliform org/ml	...	...	Nil
Total Bacteria/ml	...	...	45×10

STAFF MOVEMENT

13.6. Mr. P. Mardamootoo, Scientific Officer, is still on study leave. Two Agricultural Assistants joined the Division at the beginning of the year to replace two other members of the staff who have been appointed Clerical Assistants.

XIV. Crop Experiment Stations Division

HEAD OF DIVISION : S. Y. E. DOOMUN — AGRICULTURAL SUPERINTENDENT

14.1. Introduction

As in past years, the Division was mainly concerned in the production of vegetable seeds, the propagation of fruit trees and ornamentals and the provision of facilities to Scientific Officers for carrying out experiments. It was also responsible for the maintenance and upkeep of the Royal Botanic Gardens, Pamplemousses, the Government House, Le Reduit, Government House, Port Louis, Head Quarters House Vacoas, Quatre Bornes D.C.O. and the Central Reservation of the Tunk Road. The Stations also provided produce to Charitable Institutions.

14.1.2. The Mango Orchards at Plaisance, Richelieu and Abercrombie flowered profusely and a good crop is expected. The planting of new plant species at Royal Botanic Gardens continued. The Advisory Committee approved a plan for a Cafeteria and Show ground at the Royal Botanic Gardens, Pamplemousses.

14.1.3. The seed production programme was implemented fully. A new stringless bean variety was introduced from Australia. It is resistant to Halo Blight and observations made of the first crop showed very high yields. The variety is being multiplied for probable release next year. The price of vegetable seeds was revised in May as it was too low compared to that of imported seeds. The propagation of mango, hitherto very difficult, was tried by two different methods, the first one consisting of inarching and the second one by budding. Both methods gave very good results, the percentage take being in the region of 90%.

14.1.4. Climatic conditions were fair except for a prolonged period of drought starting in August and lasting until November. The rainfall on the different experiment stations during the year are shown on Appendices 14A.

CUREPIPE EXPERIMENT STATION

OFFICER IN CHARGE : SENIOR TECHNICAL OFFICER — D. GYA

14.2.1. Location

Latitude 20° 19'54"

Longitude 57° 30'30"

Altitude 1,830 ft.

14.2.2. Climate

Curepipe Experiment Station is situated in the super humid zone with an average annual rainfall varying between 3,048 mm. and 4,064 mm. (i.e. 120 and 160 ins). The number of wet days per annum always exceed 200.

14.2.3. *Soils*

The soils at Curepipe Experiment Station are mostly derived from grey doleritic basalts through the process of laterisation. Soils vary in colour from yellow to reddish brown. They are residual, the original high clay fraction of 70-80% being reduced by leaching to some 40% with a consequent increase of iron concretions. A feature of the soils is that though the clay fraction is high, texture and absorption are good. The fertility is very low. pH varies between 4.5 and 6.0.

14.2.4. *Weather conditions*

The total rainfall recorded during the year was 3,001.9mm. The highest rainfall was during the month of January and the lowest during the month of November.

14.2.5. *Cropping programme — (Seed Production)*

Squash Golden, Bean long Tom, Broad Bean (Bokla), Cucumber White, Pumpkins, Calabash (Calebasse), Chinese Radish (Rave Blanche), Sponge Gourd (Pipengaille).

14.2.6. *Vegetable for sale*

A very large number of vegetables are produced on the station throughout the year to demonstrate to farmers the potential of this superhumid zone. During the year the following were grown:— Local peas, celery cabbage (Petsai), watercress, beans (green), chillies cipaye, calabash (calebasse), spinach, sponge gourd (pipengaille), colocasia (songe), pumpkins, kew choy, cow peas, eggplant (bringelle), sweet potato, sweet potato (SM variety), cucumber white, cabbage, leeks, pineapple, bananas, radish, onions, squash, shallots, eddoes (arouille carri and violette), chinese (rave), groundnuts, chou chou, mandarin, mustard cabbage (brede de chine salee), mustard cabbage (brede de chine confit), mustard cabbage (brede de chine frisée), garlic with green leaves, lettuce, eggs duck, grapefruits, maize cobs, chinese white cabbage (brede de chine baton blanc), cauliflower, carrot, brede hamchoy, brede martin, bitter gourd (margoze)), strawberry, chillies dunpath.

14.2.7. *Fodder*

Fodder was supplied as usual by the station to the Livestock Breeding Station at Curepipe and to the Division of Veterinary Science.

14.2.8. *Sericulture*

The project started in March 1973 and is still going on. Larvae were sent from Reduit. After cocoons formation they were sent back to Reduit. However, by the end of the year a reeling machine was installed at Curepipe and the reeling of cocoons is being now done at the station. 19,991 cocoons weighing 30.1 kgs were sent to Reduit.

14.2.9. *Livestock*

The station raised a certain number of livestock in fishponds now under the control of the Ministry of Fisheries.

1. Ducks Muscovite	...	35
2. Ducklings Muscovite	...	19
3. Ducks Pekinese	...	3
4. Geese	...	15
Pea hen	...	1

A black swan donated by the Australian Government died on 16.6.77.

28 ducks were sold at the end of their productive life.

14.2.10. *Experiments carried by Agricultural Division*1. *Fodder variety trial*

To compare the suitability of eight grass species as a source of fodder. Varieties planted are:—

Pennisetum purpureum, *Cenchrus ciliaris*, *Chloris gayana*, *Panicum maximum*, *Brachiaria brizantha*, *Brachiaria ruziziensis*, *Tripsacum laxum*, *Setaria sphacelata*.

Experiment was set on 9.1.74 and is still in progress.

2. *Fodder*—observational trial on six grass species continued.
3. *Cucumber*—observational trial set up on 28.3.77 Varieties: Palomar, local, Poinsett—Experiment completed on 25.6.77.
4. *Strawberry*—observational trial set up on 29.3.77. Varieties: Local, Tioga, Fresno, $\frac{1}{4}$, $\frac{1}{8}$, Cambridge Rearguard—Experiment is still on.
5. *Onion*—observational trial set up on 14.4.77. Varieties: Local, Yellow Granex—Experiment completed on 10.9.77.
6. *Peas local*—To find the effect of three nitrogen and two potash levels on yield—Set up on 28.6.77—completed on 26.9.77.
7. *Cucumber*—observational trial set up on 15.10.77. Varieties: Palomar, Poinsett, Local. Several harvests have been done and experiment is still in progress.

14.2.11. Sale of produce for 1977 amounted to Rs 16,682.

14.2.12. A dozen organisations received vegetables during the year as a gift of the Ministry to Fancy Fairs, Welfare Associations and Charitable Institutions.

14.3. PLAISANCE EXPERIMENT STATION

OFFICER IN CHARGE: SENIOR TECHNICAL OFFICER — D. GYA

14.3.1. *Location*

Acreage	...	...	18.96 arpents
Soil type	...	...	Latosolic Reddish Prairie (L.R.P.)
Region	...	...	Humid
Altitude	...	...	50 feet above sea level

14.3.2. *Weather conditions*

The weather was fair. During the months of September, October and November, drought conditions prevailed. The total rainfall recorded during the year was 1422.0 mm.

14.3.3. *Cropping programme*

Coconuts orchards were completed.

14.3.4. The following crops were planted during the year 1977:—

Groundnuts local cabri (six fields)

Mustard cabbage (Brede de chine frisée)

Broad bean (Bokla) (five fields)

Brinjal Rosita

Ladies fingers (lalo perkins spineless)

14.3.5. *Experiments carried by Agricultural Division*

1. *Ginger local* — fertilizer trial

2. *Onion* — observational trial of Yellow Granex and Californian Red planted from March setts.

3. *Onion* — observational trial of Yellow Granex and Californian Red sowing of seeds

4. *Peas* — observational trial on following varieties: local, Merveille de Kelvedon and variety No. 40.

5. *Garlic* — fertilizer and spacing trial

6. *Grapes* — stock — scion — compatibility trial — still in progress.

7. *Fodder* — Whittet kikuyu — observational trial — still in progress.

8. *Elephant grass* — observational trial — variety kisosi — still in progress.

9. *Tomato* — observational trial on variety Venus — staking and pruning trial) still in progress.

14.3.6. *Disposal of produce*

The sale of produce amounted to Rs 2,135.55 during 1977.

14.3.7. Mandarins and oranges produced on the station were sold on the station and some were sent to Reduit Experiment Station for sale to labour and staff.

The following were also planted for sale and demonstration during 1977:—

Cucumber, cabbage, calabash natal, sponge gourd, sweet potato.

Seed Production and Plant Propagation

14.3.8. The programme was implemented and fruits and seeds of the following were sent to Barkly Experiment Station. Mango (Maison Rouge) (10,595 units), Baissac (1,062 units), Groundnuts (Cabri) (2 tons), Citron Assam, Grapefruits, Coconuts Pemba, Rangur lime, Accacia seeds (Local), Citron Assam, Citron Wolmar, Mustard Cabbage (Brède de Chine Frisée), Mineole Tangelo, Semineole Tangelo, Bullock's heart, Vigna Marina, Peas Local, Peas Chinese, Broad Bean (Bokla), Brinjal Rosita.

14.4

CENTRAL EXPERIMENT STATION

OFFICER IN CHARGE: SENIOR TECHNICAL OFFICER — G. GOUGES

14.4.1. The station which is at an altitude of 1,020 ft. above sea level covers an area of approximately 7 hectares, out of which 4 hectares were devoted to vegetable growing for seed production and experimental purposes. The soil is of the low humic latosolic type.

14.4.2. *Development*

The existing anthurium shed has been enlarged to cover an area of 2,400 sq. ft.

All plants in the Tea Seed Garden and all coffee plants in an old variety trial experiment have been uprooted and the land has been prepared for vegetable growing.

14.4.3. *Weather conditions*

The total rainfall recorded during the year amounted to 1072 mm. as compared to 1668 mm. the average normal (1931-70).

14.4.4. *Cropping programme*

The programme was implemented.

14.4.5. *Orchards*

14.4.5.1. Routine maintenance work was carried out. All diseased citrus plants were uprooted and infilling with seedlings will be carried out next year. Except for Ragpur lime, all Trifoliolate orange; Morton, Rusk and Troyer Citrange; Cleopatra mandarine and Tangerine Sunki have been uprooted.

14.4.5.2. A poor crop of citrus and avocado was obtained and except for the fruits of some selected plants which were used for seed production, the remainder was sold by Tender.

Approximate yield :

Avocado	...	...	850
Oranges	...	...	10,500
Grapefruits	...	...	11,000
Pamplemousses	...	...	800
Rangpur lime	...	...	2,600
Tangelo	...	...	850
Mandarines	...	...	12,000
Vangasailles	...	...	1,800

14.4.6. *Foodcrops*

14.4.7. *Sweet Potato*

The collection of varieties was uprooted in order to make land available for seed production.

14.4.8. *Manioc*

The collection of varieties was harvested in May and replanted the next month over a smaller area. The varieties consisted of the following :

Butterstick, Paloma, Yeyein, Rodney, De table, Icery Nestor, Negrita 5, Negrita 17, Bitter, Desvaux, De table St. Martin, Australia, Manioc 29, Manioc blanc, Jaune Rempart, Cassava beureum, Singapore and Jaune Trianon.

In January 121 cuttings of manioc received from the International Institute of Tropical Agriculture was planted and harvest was carried out at the end of the year when it was found to consist of a mixture of varieties.

14.4.9. *Vegetable Seed Production*

1. Pipengailles variety local—200 and 1,530 seedlings were planted in January and September respectively.
2. Brède de Chine variety Hamchoy—500 and 250 seedlings were planted in March and June respectively.
3. Sweet pepper variety Yolo Wonder—50 seedlings were planted in April.
4. Petsai Distins—1,500 seedlings were planted in May and August.
5. Rave blanche—2,654 stockings were planted in May and June.
6. Sweet pepper variety Dunputh—1,620 seedlings were planted.

7. Beetroot—4,000 seedlings were planted and after selection 353 stecklings were obtained for seed production.
8. Bokla—500 m² was planted in May and June.
9. Spinach variety Winter Giant—90 m² of bed was planted in May for a seed production trial.
10. Cabbage variety local—2,727 seedlings were planted after selection 1,078 plants were left to flower.
11. Lettuce variety mignonette—1,850 seedlings were planted and 650 were selected and left to flower.
12. Gauliflower variety Gokhool—150 seedlings were planted in April and 40 plants were selected and left to flower.
13. Lettuce variety Merveille de Quatre Saisons and Tom Pouce—300 and 240 seedlings of each respectively were planted in July.
14. Peas variety local—4,024 m² was planted.
15. Squash variety golden custard—1,150 seedlings were planted in July but the whole crop was discarded because of virus attack. 325 seedlings were replanted in October and a few fruits were obtained from virus free plants.
16. Cucumber white—2,550 seedlings were planted in August and a second plantation of 2,445 seedlings planted in October has to be disposed of as vegetable because of lack of irrigation water.
17. Bringelle variety Rosita—310 and 350 seedlings were planted in September and December respectively.
18. Pumpkin—75 seedlings were planted but the whole crop had to be sold because of virus disease.
19. Bitterground (margoze)—690 seedlings were planted.
20. Calabash (callebasse) variety Natale—109 seedlings were planted in September.
21. Chilly (Piment) variety 'curry'—200 seedlings were planted in October.
...
22. Watermelon variety sugar baby—150 seedlings were planted in October.
23. Lalo variety local—1,150 seedlings were planted in October.
24. Cowpeas—975 m² was put under cowpea.
25. Salsify—10 steckings were planted for a seed production trial.
26. Tomatoes variety Money Maker—1,200 seedlings were planted in December.

In addition various vegetables were planted for sale to labour, staff and the public. Bean—variety Norimbee, was planted for multiplication.

14.4.10. *Fodder.*

The collected of grass and legume species was maintained as usual.

14.4.11. *Experiments*

The following experiments were carried out by the Agricultural Division:—

- (a) Garlic var. Feng Shan Sel No. 1—Determination of optimum time of planting.
- (b) Garlic—Assessment of yield potential and keeping quantity of 4 varieties—namely Feng Shan Sel No.1, Feng Shan Sel no.2, Rodrigues and Pooning.

14.4.12. *Disposal of Produce*

The following were sent to Barkly Experiment Station for seed production:

Avocado, pear, Grounut var. local cabri, Mandarin local, Rangpur lime, Tangelo, Sponge gourd (pipengaille local), Sweet pepper var. Dun-puth, Sweet pepper var. Yolo Wonder, Mustard cabbage (brède de chine var. Hamchoy), Chinese (rave blanche), Celery cabbage (petsai Distin), Lettuce mignonette, Beetroot, Lettuce var. Tom Pouce, Lettuce var. Merveille de Quatre Saisons, Broad bean (Bokla), Cauliflower var. Gokool, Peas var. local, Cucumber white, Cabbage local, Spinach var. winter giant, Squash var. golden custard, Watermelon var. sugar baby, Garlic var. Feng Shan Sel No. 1.

The sale of produce during the year amounted to Rs 5,710.65.

Vegetables and fruits were also donated to various institutions for their fancy fairs.

BARKLY EXPERIMENT STATION

OFFICER IN CHARGE: SENIOR TECHNICAL OFFICER — L. C. M. LI TING WAI

14.5.1. *General*

Barkly Experiment Station is situated at an altitude of 740 ft. above sea level in latitude 20° 13.3' and longitude 57° 27.2' and has an average rainfall of 1061 mm. per annum. The soil is shallow and rocky and is of the Latosolic Reddish Prairie group.

14.5.2. *Development*

The area in front of the potting shed formerly a banana field is being filled up for transferring the potting shed inside the closed area.

14.5.3. *Weather conditions*

The total rainfall recorded during the year 1977 amounted to 1,090.16 mm. as compared to 1,061 mm. average normal.

The second half of the year was fairly dry.

14.5.4. Cropping Programme

14.5.4.1. Plant Propagation

24,736 plants of various species of fruit trees and 16,266 units of various ornamental plants were produced and issued to the sales section and to other stations. In addition 86,890 soil blocks for seed production and experiments were issued on SF 12 to various stations. 50,225 soil blocks were used on the station.

14.5.4.2. Seed Production

The seed production programme was carried out according to the approved cropping calendar:

Crops			Acreage planted		Remarks
Radish ...	...	...	... 0.02	hectare	for stecklings
Yard long bean ...	...	...	... 0.07	hectare	
Chinese Radish (rave blanche) ...	...	...	... 0.8	hectare	for stecklings
Salsify ...	...	...	... 0.01	hectare	
Beetroot ...	...	...	... 0.08	hectare	
Hot pepper cipaye ...	...	...	... 0.5	hectare	
Chinese White Cabbage (<i>brède de Chine</i> va. <i>Baton Blanche</i>) ...	...	...	... 0.06	hectare	
Cucumber white ...	...	...	... 0.67	hectare	
Coriander (<i>cotomili</i>) ...	...	...	... 2.25	hectare	
Tomato var. <i>Anahu</i> ...	...	...	... 0.01	hectare	
Chinese Spinach (<i>brède kotachee</i>) ...	...	...	... 0.9	hectare	
Peas local ...	...	...	... 1.05	hectare	
Lettuce mignonette ...	...	...	... 0.38	hectare	
Lettuce Craquant d'Éculy ...	...	...	... 0.01	hectare	
Lettuce Webbs Wonderful ...	...	...	... 0.001	hectare	
Squash Golden Custard ...	...	...	... 0.105	hectare	
Chinese Spinach (<i>brède martin</i>) ...	...	...	... 0.25	hectare	
Celery Cabbage (<i>petsai</i>) ...	...	...	... 0.12	hectare	
Peas greenfeast ...	...	...	... 0.28	hectare	
Peas chinese ...	...	...	... 0.69	hectare	
Sweet pepper var. Chinese Giant ...	...	...	... 0.32	hectare	
Carrot Chantenay Red Cored ...	...	...	... 0.005	hectare	for stecklings
Cauliflower ...	...	...	... 0.12	hectare	
Chinese Spinach (<i>brède Kotachee Réunion</i>) ...	...	...	... 0.23	hectare	
Bean local red ...	...	...	... 0.67	hectare	
Brinjal var. <i>cipaye Narain</i> ...	...	...	... 0.38	hectare	
Bitter gourd (<i>margoze C.A.T.T.</i>) ...	...	...	... 0.008	hectare	
Snake gourd (patole) ...	...	...	... 0.18	hectare	
Okra (<i>lalo</i>) ...	...	...	... 0.8	hectare	
Groundnut var. local cabri ...	...	...	... 3.03	hectare	

14.5.4.3. The following were also planted in small quantities for seed production. Pipengaille CATT, pipengaille ordinaire, brède palak, brède kotachee Reunion and bringelle cipaye blanc.

14.5.5. *Experiments*

No experiment was carried out during the year.

14.5.6. *Multiplication Section*

After processing 15,598.936 kgs of various seeds (beans, peas, ground-nuts, lettuce, rice, etc.) were issued to the seed store, 81,772 units and 2.255 kgs of seeds (ornamentals and fruit trees) were issued to nursery section for propagation. 3,923.250 kgs of seeds (pulses) were sent to the sales section.

Various plants and seeds were also given to other stations and Divisions for plantations seed production, experiments and so on.

14.5.7. *Disposal of Produce*

(i) Items issued free to other stations :

Plants	...	...	3,459 units	Rs	1,806.40
Seeds	...	...	5,383.498 kgs	Rs	29,024.34
				Rs	30,830.74

(ii) Items sold :

Plants	...	...	48,596 units	Rs	28,285.15
Seeds	...	...	12,429.579 kgs	Rs	135,695.90
Bulletins	...	...	319 units	Rs	319.00
Produce from crops	...	...		Rs	24,640.06
				Rs	188,940.11

In addition seeds worth Rs 8,795.71 were issued on SF 13 to the Ministry of Cooperatives and Development Works Corporation.

Produce worth Rs 246.45 were given free of charge to various Institutions on the occasion of their fancy fairs.

14.6. PAMPLEMOUSSES EXPERIMENT STATION

OFFICER IN CHARGE: SENIOR TECHNICAL OFFICER—F. LAM KEE

14.6.1. *Location*

Latitude 20° 06.3"

Longitude 57° 34.2"

Altitude 230 feet

14.6.2. *Soil type*

Low Humic Latosols of the Réduit family. The soil is fairly free from rocks and is good arable land with approximately six inches of top soil.

14.6.3. *Acreage*

Approximately 10 acres or four hectares.

14.6.4. *Climate*

The average annual rainfall obtained for the 9 years period 1964-1972 was 57.5 inches or 1,460.5 mm. Most of the rain falls between December and April. Winter is cool and dry whereas Summer is wet and hot.

14.6.5. *Weather conditions*

Total rainfall registered for the year was 53.1 inches or 1,349.4 mm., which was 4.4 inches below the average of 57.5 inches for the 9 year period 1964-1972.

Monthly rainfall records—same as those of the Royal Botanic Gardens, Pamplemousses.

14.6.6. *Cropping Programme*

14.6.6.1. The programme had been implemented. The following crops had been planted during the year:

Cucumber white, Watermelon Crimson Sweet, Groundnuts Local Cabri, Chillies Cipaye and Dunpath, Beans Long Tom and Pioneer, Lettuce Mignonette, Cowpeas Chinese, Rave Blanche, Peas Local, Brède de Chine Frisée and Maize local. With exception of maize, the above crops had been grown for seed production purposes.

14.6.6.2. Tobacco had not been grown this year because of the high incidence of bacterial wilt in the soils of the station. The yield of watermelon Crimson Sweet was again poor this year and it now appeared that this is not a promising variety for growing at Pamplemousses Experiment Station. Beans Long Tom and Pioneer suffered from Anthracnose and one field had to be discarded from seed production purposes. This year again, rust had made its appearance in the fields of groundnuts during the late stages of growth.

The other crops had grown satisfactorily.

Experiments

I. By Agricultural Division

Tomato

One spacing trial

One spacing/staking/pruning trial

Okra

One variety trial

On spacing/nitrogen trial

Squash

One variety observational trial

Soya beans

One variety trial

Beans

One spacing/nitrogen trial

II. By plant Pathology Division

Ginger

One chemical control of ginger blight trial

Tobacco and Tomato

Two bacterial resistance trials

Tobacco, groundnuts, maize etc.

One rotational trial on different crops.

14.6.8. *Disposal of produce*

Sent to Abercrombie Nursery, 9,182 potted plants for sale.

Sent to Barkly Experiment Station, 10,737 potted plants for sale.

Sent to Quatre Bornes Demonstration Citrus Orchard, 1,032 potted plants for sale.

Sent to Government House, Le Réduit, 20 potted plants for planting.

Sent to Rivière des Anguilles Demonstration Centre, 68 potted plants for sale.

Sent to Pamplémousses Government Secondary School, 98 potted plants for planting.

Sent to Pamplémousses Gardens. 6.100 kilos of *Setaria* grass and *Acacia* as fodder for the stags.

14.6.8.1. *Sent to Barkly Experiment Station for seed*

The following were sent to Barkly Experiment Station for processing fruits and seeds of:

Chillies Dunputh, Beans Long Tom, Mustard Cabbage (*Brède de Chine Frisée*), Peas local, Tomato venus, Lettuce Mignonette, Chinese Radish (*Rave Blanche*), Groundnuts (Local Cabri), Maize local, Okra Perkins Spineless, Cucumber White, Cowpeas.

14.6.8.2. *Sent to Livestock Feed Factory*

905.0 kgs of local maize had been sent to the Livestock Feed Factory to be turned into animal feed concentrates.

Total revenue collected for the year was Rs 17,467.30.

Total revenue collected for booklets for the Gardens was Rs 11,060.00

Total revenue collected for vegetables, fruits, palm seeds and pulses was Rs 6,407.30.

14.7. ROYAL BOTANIC GARDENS, PAMPLEMOUSSES

OFFICER IN CHARGE: SENIOR TECHNICAL OFFICER — F. LAM KEE

14.7.1. *Location*

Latitude 20° 06.3"

Longitude 57° 34.2"

Altitude 230 feet

14.7.2. *Soil type*

Low Humic Latosols of the Réduit family.

14.7.3. *Acreage*

Approximately 67 acres or 26.8 hectares.

14.7.4. *Climate*

The average rainfall obtained for the nine years period 1964-1972 was 57.5 inches or 1.460 mm. Most of the rain falls between December and April. Winter is cool and dry whereas Summer is wet and hot.

Total rainfall registered for the year 1977 was 53.1 inches or 1,349.4 mm., which was 4.4 inches below the average of 57.5 inches for the 9 years period 1964-1972.

14.7.5. *Development*

The Section U, of the Gardens had been reserved for the planting of Indigenous plants suited to the dry lowlands of the country. Planting of trees in this Section had been started at the end of the year.

14.7.6. *General*

14.7.6.1. Replanting of trees blown by Cyclone "Gervaise" had been continued. A total of 989 plants had been planted in the Gardens during the year.

14.7.6.2. Visitors were re-allowed to enter the gardens with their vehicles at the end of July 1977. However the Gardens were still closed to vehicles on Sundays and Public Holidays.

14.7.7. *Livestock*

19 stags—four males and fifteen females

22 tortoises—Six males, three females and fifteen young ones.

3 female stags were born during the year.

One Old male had died and two other males had been disposed of through the Meat Authority because they were found to be in a bad shape through fighting during the rut season.

14.7.8. *Visits*

During the year, there were 367,370 visits made to the Gardens (including 6,360 visits made by School Children).

14.8

ABERCROMBIE NURSERY

OFFICER IN CHARGE: SENIOR TECHNICAL OFFICER — F. LAM KEE

14.8.1. *Location*

Abercrombie Nursery is situated two miles from the Centre of Port Louis at Terre Rouge. It supplies Port Louis and the districts of the North with plants.

14.8.2. *Soil type*

The soil belongs to a very stony phase of Low Humic Latosols group (Richelieu family).

14.8.3. *Acreage*

Approximate 5 acres

14.8.4. *Climate*

At the station is found in the sub-humid zone, the annual rainfall is less than 50 inches. The average annual rainfall obtained for the ten years period 1964-1973 was 45.8 inches or 1,163.5 mm.

14.8.5. *Weather conditions*

Rainfall obtained for the year 1977 was 1,134.0 mm. which was close to the average of 1,163.5 mm. for the 10 years period 1964-1973.

14.8.6. *Mango Orchard*

This year, the mango fruits had not been sold through tender. The Maison Rouge and Dauphinée fruits would be kept for sowing purposes for use as rootstock or for sale as seedlings, whilst the rest would be sold to labour and staff of the Agricultural Services and members of the public.

14.8.7. *Cropping programme*

The following crops had been planted during the year:

Bitter gourd, watermelon sugar baby, chillies chinese giant, radish, tomato stakeless, brède de chine bouquet and cassava.

Chillies chinese giant suffered from a virus disease and many plants had to be uprooted. Owing to a lack of irrigation water, watermelon fruits obtained were small.

14.8.8. *Propagation programme*

This year again, coconuts of the varieties Malayan dwarf red and Malayan dwarf yellow had been imported from Malaysia. 3,014 of these nuts had been sown at the Abercrombie Nursery during the month of

August 1977. Delivery of the germinated nuts to the public had been done through a waitinglist prepared by the Senior Technical Officer in charge Plant Propagation.

Cuttings propagated during the year ...	...	36,400
Seeds sown during the year ...	...	20,669
Layers and grafts ...	...	500

14.8.9. *Disposal of produce*

Sent to Quatre Bornes Demonstration Citrus Orchard for sale, 225 potted plants

Sent to Barkly Experiment Station for sale, 865 potted plants

Sent to Flacq Demonstration Centre for sale, 22 potted plants

Sent to Rivière des Anguilles Demonstration Centre for sale, 42 potted plants

Sent to Réduit Experiment Station for planting on the trunk road, 965 potted plants

Sent to Plaisance Experiment Station for planting, 87 coconut seedlings

Sent to Pamplémousses Experiment Station for planting, 72 coconut seedlings

Sent to Pamplémousses Experiment Station for propagation purposes, 2,500 Maison Rouge seeds

In addition 355 potted plants had been sent to various Ministries for planting

14.8.10. *Sent to Barkly Experiment Station for seed*

Fruits of the following:

Bitter gourd, Watermelon, Chillies Chinese Giant, Radish, Tomato Stakeless Chinese White Cabbage (Brède de Bouquet, Brède de Chine CATT), Beans Long Tom.

14.8.11. *Sales*

Fruit trees

Seedlings citrus ...	...	3,617 units
Seedlings mango ...	...	625 units
Seedlings coconut ...	...	3,723 units
Seedlings others ...	...	7,572 units
Cuttings ...	...	1,738 units
Layers letchi ..	...	1,474 units
Grafts citrus ...	...	38 units
Grafts mango ...	...	41 units
Grafts others ...	...	48 units

Ornamentals

Seedlings ...	...	3,815 units
Cuttings ...	...	11,233 units
Layers ...	...	332 units

14.8.12. *Fruits and Vegetables*

Pawpaws 134 units; Grapes 16.0 kilos; Green mangoes 797 units; Ripe mangoes 2,971 units; Watermelon 721.5 kilos; Tomatoes 91.0 kilos; Coconut cabbage 3 units; Rave 197 units; Cassava 679.25 kilos; Lettuce 915 units; Brède Martin 79.5 kilos; Brède Kotachee 32.5 kilos; Brède de chine Bouquet 52.0 kilos; Margoze 51.75 kilos; Brinjals 211.25 kilos and Echalote 7.0 kilos.

Total revenue collected for the year was Rs 25,750.38.

14.9.

RICHELIEU EXPERIMENT STATION

OFFICER IN CHARGE: SENIOR TECHNICAL OFFICER —

Y. L. KONG TING LUN

14.9.1. *General*

The station is situated in the North West part of the Island at an elevation of 220 ft. above sea level. The climate is excessively dry. Annual rainfall being in the region of 30" (750 mm.) most of which falls in January, February and March. The soil is reddish and classified as LowHumic Latosol (Richelieu family).

14.9.2. *Weather conditions*

The growing conditions for the crops throughout the year were not at all very favourable although the total rainfall recorded for this year amounted to 716.2 mm. (28.64 inches) compared to the mean for the last five years which is 697.4 mm. (27.9"). The drought conditions which were prevailing since the month of August had a harmful effect mainly on crops such as groundnut, maize and watermelon. However the supply of irrigation water from La Ferme Reservoir permitted the implementation of the cropping programme. The wettest month was February with 184.8 mm. and the driest month being September with nil rainfall.

14.9.3. *Cropping programme*

14.9.3.1. *Tobacco*

The crop in summer was mainly for seed production. The area planted and the quantity of seed produced for each variety is given below :

Variety	Type	Field No.	Hectareage	Seed Produced
Amarello	... air cured	B2F3	0.32 hec.	2.5 kgs.
NC 95	... flue cured	B2F3	0.98 hec.	14.0 kgs.
YM	... flue cured	B2F3	0.02 hec.	0.5 kgs.
SC 66	... flue cured	B2F3	0.63 hec.	4.5 kgs.
TOTAL ...			1.95 hec.	21.5 kgs.

The second season was planted in September and consisted of 0.4 hectare of NC 95, 0.03 hectare of YM and 0.03 hectare of SC 66. The leaf quality was better than that of last year since the average price per kg of flue cured leaves obtained for this year is Rs 15.17 compared to that of last year which was Rs 12.18. Average price per kg of air cured leaves obtained is Rs 8.90 compared to Rs 5.77, the figure for last year. The fuel consumption for this amounted to Rs 1,575 gallons of diesel gas oil (725 gal. at Rs 3.82 and 850 gal. at Rs 4.14) plus 81 cords firewood at Rs 38. per cord. Thus the cost of fuel to produce 1 kg of flue cured leaf is Rs 2.18. The figure for last year was Rs 2.13.

14.9.3.2. *Groundnut*

Only 3.1 hectares of groundnut variety local cabri were planted for seed production. 4.4 hectares have not been planted because of drought. A fair crop is expected and will be harvested next year. Last year's planting was harvested and the yield was 7,006.4 kgs.

14.9.3.3. *Maize*

4.31 hectares of local maize were grown for seed production. The best scob were selected and sent to Barkly and rest sold to Livestock Feed Factory.

14.9.3.4. *Sweet Potato*

The four SM varieties together with the nine chinese varieties namely Yue 70-9, White starch, Peking, Little leaf, Leek, Kwang tung 16, Chow Nung 69-219, Chestnut and Chain 69-285 were propagated in nursery and in mixed orchard as interrow crop with a view to supply planting materials to other stations and and planters.

14.9.3.5. *Cane*

All sugarcane plantations (12.25 hectares) have been kept as fodder to be supplied to the Livestock Section.

14.9.3.6. *Vegetables seed production*

The production of vegetable seeds was carried out according to cropping programme. All produce was sent to Barkly Experiment Station. The plantations of bean suffered severely from halo blight despite regular spraying of fungicide. 1548.5 kgs have been sold as pulses and 678 kgs have been sold as 'haricot pale'.

14.9.3.7. *Orchards*

Routine maintenance work was carried out in all orchards. The cultural operations such as wedding, pruning, irrigation and control of pest and diseases were done regularly. The letchi and mango crops for this year were sold by tender.

14.9.4. *Experiments*

The following experiments were carried out by the Agricultural Division:—

14.9.4.1. *Tobacco*

1. One variety trial to compare the yield, leaf quality and gross returns of nine flue cured virginian tobacco varieties, namely Yellow Mammoth, NC95, SC66, SC71, SC72, SCR, Coker 347, Speight G28 and G33. (This experiment was repeated in September 1977).

2. One fertiliser trial to determine the optimum level of nitrogen to maximize gross returns of variety NC95. (This experiment was repeated in August 1977).

3. One experiment to determine the optimum time of tobacco planting. (This experiment was repeated in August 1977).

4. One experiment to compare the effects of hand suckering and chemical suckering on the yield, leaf quality, pest incidence and gross returns of NC95. The chemicals under experiment are (a) Royal MH (b) MH30 (c) Royal TAC and (d) Offshoot T85. (experiment was repeated in September 1977).

5. One potash fertiliser trial to compare the effects of five levels of potash (060, 120, 180 and 240 kg K₂O/hectare) on the yield, leaf quality and gross returns of NC95. (This experiment was repeated in August 1977).

6. One water regime trial on tobacco variety NC95.

14.9.4.2. *Pomme d'amour*

(a) One water regime trial on pomme d'amour local;

(b) *Tomato*

A variety trial to compare the yield potential of nine varieties of tomato namely Delicious, Money Maker, Venus, Ace, Tropic Marglobe and Heinz 1370.

14.9.4.3. *Bean*

An experiment to compare the effect of six different furrow spacings on the yield of bean (green pods) with a given water regime.

14.9.4.4. *Accacia*

1. One experiment to determine the optimum spacing for accacia plantation.

2. One experiment to determine the seed production potential of accacia variety Peru.

14.9.4.5. *Sunflower*

1. An observational trial on sunflower varieties namely Hurst Gunson 1101, Hurst Gunson 1104, Hurst Gunbrid and Hurst Cirobird.

2. Another observational trial on sunflower varieties namely Gor 33, Gor 104 and Intesstate 894.

14.9.4.6. *Rice*

1. A rice variety trial in Virgin sugarcane. The varieties are (a) Er chu chin (b) Lew sew chao (c) Kwang loo i No. 4 (d) Kwang chiet chew (e) Red plum zao (f) Chen chui No. 11.

2. An experiment to determine the optimum area for rice. The sugarcane spacings are 5 ft $\times$ 5 ft, 6 ft $\times$ 4 ft and 7 ft $\times$ 3 ft.

3. An experiment to find the effect of sugarcane row orientation on rice yield (East-west rows of sugarcane as twin 5-5 ft rows and North-south rows of sugarcane as twin 5-5 ft rows).

4. An experiment to determine the potential of rice varieties namely Chen chue i No. 11, Nanking No. 11, Kwang Er i 53 and TN1 grown on upland condition under pure stand and overhead irrigation.

An experiment to study the response of rice to the source of inorganic nitrogen.

14.9.5. *Disposal of Produce*

Rs 91,797.25 worth of produce were sold from the station.

Visits on Station

There were visits from Students of the University of Mauritius.

14.10. TEA EXPERIMENT STATION

OFFICER IN CHARGE: SENIOR TECHNICAL OFFICER — J. DINDOYAL

14.10.1. *Introduction*

The Tea Experiment Station is found along the main road from Curepipe leading to Quartier Militaire at an elevation of 1850 ft above sea level within the annual rainfall range of 3800mm. The climate is rather cool and the average daily sunshine is six hours. The soil is of Brown Forest Latosolic type.

14.10.2. An area of 68 arpents is under tea of which eight arpents were used for experimental purposes during the year.

14.10.3. *Development*

A mess room for workers and a carpenter's workshop were built on the station. The structure is of cement blocks and the roof of iron sheets. But due to lack of funds proper sitting arrangements could not be made and the doors and windows have not been placed yet.

14.10.4. *Nursery*

The mother bushes (VP) were pruned to 21 inches and were treated with M45 and folimat.

14.10.5. *Weather conditions*

A drought persisted during mid October to end November and arrangements had to be made to water potted tea cuttings during that period. The total rainfall for the year was 2739 mm. below the normal 3960 mm. The wettest month was January with a precipitation of 477.27 mm. and the driest month was June with a precipitation of only 53.9 mm. However it is interesting to note that December was the only month with a rainfall above the seasonal normal. The precipitation was 343 mm. for that month (normal 301 mm).

14.10.6. *Cropping programme*

The total weight of green leaves harvested was 605,840 $\frac{1}{2}$ kg, bettering last year's record yield of 585,275 $\frac{1}{2}$ kg by 3.5%.

14.10.7. Once again the full cooperation of the staff and labourers on the station and improved cultural practices have contributed to a very good harvest. The yield could have been better had it not been for the drought period of mid-October end-November and unjust water deductions made by Dubreuil Tea Factory — a total of 12,750 kg for the whole year.

14.10.8. Table 14.2. (Yield of green leaves 72-77).

14.10.9. The average yield of green leaves per arpent in half kg was superior to the highest so far of 1976 by 3.5%.

14.10.10. Table 14.3. — Average yield/arpent (half kg) for 71-77.

14.10.11. Table 14.4. — Field Management.

14.10.12. *Seeds gardens*

Three of the seven seeds gardens have been closed viz:—

Central Experiment Station (Redit), Nouvelle Découverte and Curepipe. As there is no demand for seeds any longer no seed was collected last year and a request for closing down the other seeds gardens and transferring the staff to other sites of work was made during the year.

14.10.13. *Experiments*

The staff on the station cooperated with the Agricultural Division in various experiments:—

- (a) Optimum pruning cycle (one to five years)
- (b) Effect on yield of split application of nitrogen
- (c) Optimum rate of application of nitrogen
- (d) Effect of NPK application in the year of prune followed by the application of N only during the subsequent years
- (e) Optimum time of prune
- (f) Optimum pruning height
- (g) Optimum tipping height
- (g) Uptake of phosphorous in presence of mulching

14.10.14. *Disposal of produce*

605,840 $\frac{1}{2}$ kg of leaves were sent to Dubreuil Tea Factory. 397,650 cuttings were issued free to the Tea Development Authority.

TABLE 14.1

WEATHER CONDITIONS

<i>Month</i>	<i>Rainfall in mm</i>	<i>Temperature of</i>		<i>Relative Humidity %</i>
		<i>Min.</i>	<i>Max.</i>	
January ...	... 477.27	68.3	79.8	89.2
February ...	... 334.52	69.6	74.3	80.9
March ...	... 276.86	71.5	74.8	82.3
April ...	... 410.97	68.5	73.3	81.5
May ...	... 234.70	65.0	74.4	82.4
June ...	... 53.90	61.6	71.7	84.1
July ...	... 228.60	59.1	68.1	88.8
August ...	... 163.33	60.2	71.9	84.9
September	... 79.75	57.7	71.9	81.3
October ...	... 79.00	61.0	75.2	87.7
November	... 55.37	62.8	78.4	84.0
December ...	... 343.82	67.1	80.7	85.6
TOTAL ...	... 2739.16			
Average ...	... 228.26	64.3	74.5	85.2

TABLE 14.2

YIELD OF GREEN LEAVES IN HALF KG. FOR 1972-1977

	1972		1973		1974		1975		1976		1977	
	Yield	% total	Yield	% total	Yield	% total	Yield	% total	Yield	% total	Yield	% total
January	61,578	14.91	73,056	16.58	80,748	17.50	90,797	21.37	80,363	13.73	89,260	14.73
February	30,872	12.32	54,520	12.37	52,502	11.59	20,575	4.84	55,900	9.55	71,860	11.86
March	53,342	12.92	71,808	16.29	72,146	15.64	67,824	15.96	92,620	15.82	103,320	17.05
April	47,286	11.45	57,802	13.11	53,764	11.65	47,002	11.06	71,140	12.15	73,780	12.17
May	37,490	9.08	27,998	6.34	31,930	6.92	48,538	11.42	47,840	8.17	55,440	9.15
June	15,576	3.77	11,766	2.66	11,684	2.53	18,824	4.43	30,880	5.27	21,920	3.61
July	9,894	2.40	3,758	0.85	4,658	1.01	5,455	1.30	12,080	2.06	7,220	1.19
August	7,686	1.86	4,924	1.09	2,330	0.50	4,602	1.08	5,252	0.89	—	—
September	16,526	4.00	9,390	2.17	10,082	2.19	4,120	0.96	11,940	2.04	11,460	1.89
October	24,720	5.98	41,782	9.47	34,066	7.39	28,900	6.80	39,760	6.79	40,240	6.64
November	40,720	9.86	36,226	8.22	39,534	8.57	38,200	8.99	57,200	9.77	52,740	8.70
December	47,274	11.45	42,866	10.85	67,950	14.52	49,886	11.74	80,300	13.72	78,600	12.97
Total	412,990		440,788		461,389		424,812		585,275		605,840	

TABLE 14.3

AVERAGE YIELD PER ARPENT (HALF KG) FOR 1971-1977

<i>Year</i>	<i>Yield</i>
1971	6514
1972	5921
1973	6320
1974	6615
1975	6091
1976	8607
1977	8909

TABLE 14.4

FIELD MANAGEMENT

<i>Field No.</i>	<i>Acreage (arp.)</i>	<i>1975</i>	<i>1976</i>	<i>1977</i>
1	3.05	Prune	Unprune	Unprune
2	3.98	Prune	Unprune	Unprune
3	2.86	Unprune	Deep skiff	Prune
4	4.73	Deep skiff	Prune	Unprune
5	2.40	Prune	Unprune	Deep skiff
6	3.32	Prune	Unprune	Deep skiff
7	3.96	Unprune	Deep skiff	Prune
8	5.26	Unprune	Deep skiff	Prune
9	3.29	Unprune	Deep skiff	Prune
10	2.43	Unprune	Deep skiff	Prune
11	2.44	Unprune	Deep skiff	Prune
12	3.87	Medium prune	Light skiff	Unprune
13	1.92	Prune	Unprune	Deep skiff
14	4.93	Unprune	Deep skiff	Prune
15	3.26	Unprune	Deep skiff	Prune
16	3.59	Prune	Unprune	Unprune
17	3.40	Prune	Unprune	Unprune
18	2.69	Unprune	Light skiff	Deep skiff
19	2.63	Prune	Unprune	Deep skiff
20	0.90	Medium prune	Unprune	Unprune

Appendix 14 A

CUREPIPE EXPERIMENT STATION

Hereunder, the rainfall record for 1977 compared to the average of the past years.

			<i>Average for 1964-76</i>	<i>Rainfall 1977 (mm)</i>
January	...	...	507.7	456.2
February	...	...	841.6	392.1
March	...	...	528.5	272.2
April	...	...	470.7	434.1
May	...	...	430.4	232.3
June	...	...	441.6	130.6
July	...	...	309.7	188.2
August	...	...	341.8	167.2
September	...	...	202.6	126.6
October	...	...	194.7	117.6
November	...	...	140.8	76.6
December	...	...	374.7	407.7
				3,001.9 mm

PLAISANCE EXPERIMENT STATION

Hereunder is the rainfall record for 1977.

	<i>Month</i>	<i>Rainfall in mm.</i>
January	...	425.0
February	...	271.5
March	...	129.5
April	...	180.7
May	...	252.5
June	...	83.2
July	...	80.5
August	...	62.2
September	...	29.9
October	...	41.2
November	...	35.3
December	...	230.5

CENTRAL EXPERIMENT STATION

Rainfall — monthly total (mm.) and difference from normal

<i>Month</i>	<i>Rainfall</i>	<i>Average normal</i>	<i>Difference from normal</i>
January ...	250	289	— 39
February ...	310	268	+ 42
March ...	95	277	—182
April ...	169	138	+ 31
May ...	36	83	— 47
June ...	36	82	— 46
July ...	77	78	— 1
August ...	13	59	— 46
September ...	17	59	— 42
October ...	17	39	— 22
November ...	—	89	— 89
December ...	52	207	—155
TOTAL ...	1072	1668	—596

BARKLY EXPERIMENT STATION

The table below shows the monthly rainfall compared to average normal

<i>Month</i>	<i>Actual (mm)</i>	<i>Average normal (mm)</i>
January ...	207.00	187
February ...	235.10	143
March ...	165.00	193
April ...	178.10	104
May ...	165.00	60
June ...	27.50	38
July ...	43.34	45
August ...	0.96	25
September ...	3.40	21
October ...	10.00	31
November ...	Nil	45
December ...	54.76	109
	1090.66	1061

ANNUAL REPORT OF THE
ROYAL BOTANIC GARDENS

	<i>Month</i>		<i>Rainfall (mm)</i>	<i>Average for period 1964-72</i>
January	...	...	214.6	244.6
February	...	...	212.1	174.6
March	...	...	64.0	241.8
April	...	...	208.0	156.2
May	...	...	140.6	80.0
June	...	...	93.7	82.8
July	...	...	117.8	106.9
August	...	...	44.2	90.7
September	...	...	43.2	51.3
October	...	...	28.1	46.0
November	...	...	34.0	70.6
December	...	...	149.1	95.6

ABERCROMBIE NURSERY

	<i>Month</i>		<i>Monthly rainfall (mm)</i>	<i>Average monthly rainfall 1964-73</i>
January	...	...	212.7	257.8
February	...	...	212.7	134.0
March	...	...	56.0	189.6
April	...	...	228.4	118.0
May	...	...	82.0	57.3
June	...	...	30.7	57.3
July	...	...	68.6	61.9
August	...	...	31.1	53.1
September	...	...	15.8	27.4
October	...	...	23.0	30.2
November	...	...	13.6	60.8
December	...	...	159.4	116.7

Appendix 14. B

SEEDS ISSUED 1977

<i>Crop</i>	<i>Varieties</i>	<i>Issued free to stations and demonstra- tion centres (kgs)</i>	<i>Sold at Barkly E. S. kgs</i>	<i>Total kgs</i>
Acacia ...	...	5.430	25.750	31.180
Bean — Haricot ...	Long Tom, Local Red, Pioneer	1,350.850	3,929.250	5,280.100
Beetroot — Betterave ...	Local ...	1.693	13.971	15.664
Broad bean — Bokla ...	...	72.150	0.50	72.650
Chinese white cabbage — Brede de chine	Baton Blanc, Bouquet ...	13.474	221.060	234.534
Mustard cabbage — Brede de chine	Frisee, Salee, Hamchoy	1.902	14.918	16.820
Chinese spinach — Brede ...	Kotachee (Malbar), Palak	5.244	244.263	251.414
Cabbage — chou ...	Local ...	1.765	19.436	21.201
Cauliflower — Chou fleur ...	Local ...	1.554	20.865	22.419
Calabash — Calebasse ...	Natale ...	2.325	57.346	59.671
Celery cabbage — Petsai ...	Distins ...	0.581	5.306	5.887
Chilly — Piment ...	Cipaye ...	0.648	5.840	6.488
Coriander — Cotomili ...	Morocco ...	23.825	435.975	459.800
Cowpeas chinese — Vœhm ...	...	12.840	185.570	198.410
Chinese radish — Rave ...	...	15.486	94.714	110.200
Cucumber — Concombre ...	White ...	2.023	89.802	91.825
Eggplant — Bringelle ...	Cipaye Narain, Rosita,	1.276	10.952	12.228
Groundnut — Pistache ...	Cabri ...	1,325.500	4,784.000	6,109.500
Okra — Lalo ...	...	2.995	70.165	73.160
Lettuce — Laitue ...	Mignonette, Sucrine, Tom Pouce, Iceberg, Reine des Glaces, Mer veille des quatre Sai- sons, Blonde d'Ete, Craquant d'Eculy, Webbs Wonderful ...	0.994	9.350	10.344
Pea — Petit pois ...	Local, Greenfeast, Chi-	349.533	2,246.250	2,595.783
Pomme d'amour ...	...	3.021	50.387	53.408
Radish — Radis ...	Giant Globe ...	1.254	7.625	8.879
Rice — Riz ...	TN ...	...	502,500	502.500
Salsify — Salsifis ...	...	0.069	0.369	0.438
Sponge gourd — Pipengaille ...	Local, CATT ...	3.797	51.564	55.361
Snake gourd — Patole ...	...	0.695	18.797	19.492
Sweet pepper — Poivron ...	Chinese Giant Dunputh	0.325	5.915	6.240
Tomato — Tomato ...	Marglobe, Moneymaker	0.219	2.022	2.241
Watermelon — Melon d'eau ...	Sugar baby ...	2.010	40.030	42.040
Yard long bean ...	...	3.200	25.215	28.415
Pumpkin — Giraumon ...	...	3.066	68.645	71.711
Bitter gourd — Margoze ...	Local, CAM, CATT ...	1.073	4.293	5.366
Squash — Patisson ...	Golden Custard ...	4.702	33.761	38.463

Appendix 14. C**MANIPULATION SECTION B.E.S. 1977**

<i>Item</i>	<i>Amount Received</i>		
Acacia ...	...	...	121 kgs rough clean seeds
Bean ...	...	...	8,054.288 kgs rough clean seeds
Beetroot ...	...	...	76.520 kgs rough clean seeds
Bitter gourd ...	...	...	7,031 units fruits
Broad bean ...	...	...	766.160 kgs pods
Cabbage ...	...	...	180.350 kgs rough clean seeds
Cauliflower ...	...	...	52.364 kgs rough clean seeds
Calabash ...	...	...	440 units fruits
Celery cabbage ...	...	...	34.965 kgs rough clean seeds
Chilly ...	...	...	53.361 kgs fruits
Chinese white cabbage ...	...	...	157.600 kgs rough clean seeds
Mustard cabbage ...	...	...	524.887 kgs rough clean seeds
Chinese spinach ...	...	...	1,560.050 kgs rough clean seeds
Coriander ...	...	...	2,647.600 kgs rough clean seeds
Cowpeas chinese ...	...	...	427.400 kgs pods
Chinese radish ...	...	...	1,013.600 kgs rough clean seeds
Cucumber ...	...	...	22,129 units fruits
Eggplant ...	...	...	4,425 units fruits
Groundnut ...	...	...	18,253.900 kgs rough clean seeds
Lettuce ...	...	...	44.628 kgs rough clean seeds
Okra ...	...	...	424.535 kgs pods
Peas ...	...	...	2,141.900 kgs rough clean seeds
Pomme d'amour ...	...	...	8,284.900 kgs fruits
Radish ...	...	...	30.175 kgs rough clean seeds
Rice ...	...	...	3,590.450 kgs rough clean seeds
Salsify ...	...	...	1.686 kgs rough clean seeds
Sponge gourd ...	...	...	7,235 units fruits
Snake gourd ...	...	...	1,361 units fruits
Squash ...	...	...	1,787 units fruits
Sweet pepper ...	...	...	12,021 units fruits
Tomato ...	...	...	551.700 kgs fruits
Watermelon ...	...	...	2,768 units fruits
Yard long bean ...	...	...	61.825 kgs pods

Appendix 14. D

	<i>Seedlings</i>	<i>Cuttings</i>	<i>Layers/graft</i>	<i>Coconut seedlings</i>
Ornamentals ...	13,978	29,074	803	
Fruit tress ...	13,271	4,045	5,303	5,486
	27,249	33,119	6,106	5,486

XV. Livestock Breeding Stations

HEAD OF DIVISION: Y. AUMJAUD, AGRICULTURAL SUPERINTENDENT

15.1. This Division is responsible for the management of four Stations viz (i) Curepipe Livestock Breeding Station, (ii) Richelieu Livestock Breeding Station, (iii) Palmar Livestock Breeding Station and (iv) Poultry Breeding Centre.

15.2. CUREPIPE LIVESTOCK BREEDING STATION

15.2.1. *Milch Cattle*

At the end of the year, the Curepipe Livestock Breeding Station carried a total of 224 head of Milch Cattle — 46 males and 178 females. There were 82 calvings during the year — 41 males and 41 females. The average birth weight was 30 kgs and average weaning weight at 90 days was 68 kgs. The number of calves weaned during the year were 31 males and 40 females.

Sale : 3 bulls and 25 cows were sold for slaughter through the Mauritius Meat Authority.

Death : 3 bull calves, 6 heifer calves and 2 cows died during the year.

Transfer : 34 young bulls and 19 heifers were transferred to Richelieu Livestock Breeding Station. 1 cow was transferred to Flacq Demonstration Centre, and 1 cow to Rivière des Anguilles Demonstration Centre.

During the year 3 heifers were received from the Entomology Division, 2 cows from Rivière des Anguilles Demonstration Centre and 1 cow and 1 heifer from Plaisance Demonstration Centre.

15.2.2. *Milk Production*

Over a lactation period of 305 days, the average production was 6.6 kgs of milk per head per diem. The first calvers yielded an average of 5.6 kgs of milk per head per diem; the best performer yielded 7.4 kgs with a peak of 12.5 kgs. Second calvers yielded an average of 7.4 kgs of milk per head per diem; the best performer yielded 9.4 kgs with a peak of 17.7 kgs. Third calvers yielded an average of 6.4 kgs of milk per head per diem; the best performer yielded 7.0 kgs with a peak of 15.7 kgs. Cows with more than three calvings gave an average of 7.1 kgs of milk per head per diem; the best performer yielded 8.0 kgs with a peak of 16.6 kgs.

15.2.3. An experiment on the "Effect of restricted suckling on incidence of mastitis in the cows and on growth rate of the calves" which started in January 1977 continued up to the end of August.

15.2.4. The total quantity of milk produced during the year was 133,952.0 litres, out of which 86,725.0 were issued to the Milk Pasteurisation plant, 23,420.8 litres were fed to calves, piglets and rabbitlings, 23,700.0 litres were sold to contractor and 106.2 litres were discarded due to mastitis.

15.2.5. *Milk Pasteurisation Plant*

86,725.0 litres of milk received from the Station and 29 litres brought forward for 31st December, 1976 were handled at the Pasteurisation Plant.

74,115.0 litres of pasteurised milk and 11,463.0 litres of raw milk were sold to the Hospitals, 150 litres were sold to staff, 405 litres which turned sour had to be discarded, 427.5 litres were sent for analysis. The loss of milk occurred on pasteurisation during the year amounted to 193.5 litres.

15.2.6. *Pigs*

At the end of the year, the total number of pigs at the Station was 46 - 12 sows, 3 boars, 2 young boars, 5 gilts and 24 piglets.

176 piglets were farrowed with an average of 9.3 piglets per litter. The average birth weight of piglets was 1.35 kgs. During the year 19 litters were recorded; 21 litters were weaned with an average of 7.0 piglets per litter. The average weaning weight at 8 weeks old was 13.3 kg per piglet.

Sale : 2 sows, 1gilt, 1 boar and 1 male weaner were sold for slaughter. 126 pig weaners were sold to the Pig Credit and Marketing Co-operative Society for distribution to members of the Society.

Death : 1 sow and 41 piglets died during the year.

Transfer : 3 young boars and 4 female weaners were transferred to Palmar Livestock Breeding Station.

15.2.7. *Rabbits*

At the end of the year the total number of rabbits was 133—23 adult bucks, 27 young bucks, 24 adult does, 35 young does and 24 rabbitlings. There were 38 kiddings during the year, yielding a total of 162 rabbitlings. The deaths amounted to 78 — 25 adults and 53 rabbitlings. 62 rabbits were sold to breeders and 62 rabbits unfit for breeding were sold for slaughter. 7 rabbits were issued to the Division of Veterinary Services and the Plant Pathology Division and 12 males were returned by the latter.

15.2.8. *New Zealand Cattle*

The 13 young bulls which were under the stomoxys experiments at La Brasserie since last year were sold for slaughter in August 1977 — at the end of the experiment.

Transfer : 2 New Zealand cows were transferred from Richelieu Livestock Breeding Station just after calving in order to assess their potential of milk yield.

15.2.9. *Goats*

4 goats culled and returned from the Extension Services were sold for slaughter through the Mauritius Meat Authority.

15.2.10. *Manure*

The total quantity of manure delivered from the station was 1881.900 tons. 1,196.50 tons were collected by the Experimental Stations, 685.400 tons were sold to the Development Works Corporation, Ministry of Health, Ministry of Fisheries and a few farmers.

15.3. RICHELIEU LIVESTOCK BREEDING STATION

15.3.1. *New Zealand Cattle*

At the end of the year, the Richelieu Livestock Breeding Station carried a total of 416 head of cattle — 68 cows, 292 Heifers, 24 Heifer-calves, 1 Sire and 31 Bull-calves. There were 67 calvings during the year — 30 females and 37 males. The average birth weight was 26 kg and the average weaning weight at 90 days 57 kgs.

Sale : 2 cows, 83 heifers and 1 male calf were sold for slaughter through the Mauritius Meat Authority.

25 young heifers and 12 young bulls were sold to the Mauritius Meat Producers Association for fattening.

Death : 18 calves died during the year.

Transfer : 2 young calves were received from Curepipe Livestock Breeding Station. 2 cows were transferred to Curepipe Livestock Breeding Station and 1 sire to Palmar Livestock Breeding Station.

3 heifer-calves were transferred to the Entomology Division. 4 cows and 4 calves were collected from cowkeepers of the Rural Development Project. One cowkeeper in this project was given a pregnant cow from the Station.

15.3.2. *Creole Cattle*

At the end of the year the Station carried a total of 46 head of creole cattle — 2 cows, 32 heifers, 1 heifer-calf, 1 sire and 10 young bulls. There were 2 calvings during the year — 1 female and 1 male.

Sale : 1 young bull was sold for slaughter through the Mauritius Meat Authority. 26 young bulls were sold to the Mauritius Meat Producers Association and to some small cowkeepers.

Death : 1 young heifer and 1 bullcalf died during the year.

Transfer : 1 sire was transferred to the Division of Veterinary Services. 2 young bulls and 1 heifer were received from the Demonstration Centres. 19 heifers and 34 young bulls were received from Curepipe Livestock Breeding Station.

15.3.3. *Sahiwal cattle*

At the end of the year there were 25 sahiwal cattle at the Station, consisting of 12 cows, 4 heifer-calves, 2 sires, 2 young bulls and 5 bull-calves. There were 10 calvings during the year — 7 males and 3 females.

Sale : 5 cows were sold for slaughter.

3 young females and 5 young males were sold to the Mauritian Meat Producers Association for breeding.

Death : 1 cow, 2 bull-calves and 1 heifer-calf died during the year.

Transfer : 2 cows and 2 sires were transferred to Rodrigues.

15.3.4. *Milk Production*

During the year 41,445.5 litres of milk were produced, out of which 3,376.4 were fed to calves, 34,243.7 litres were sold to staff, 2,600 litres were sold to Hospital, 39 litres were issued to the Dairy Chemistry Division. The loss of milk occurred through decantation and handling for the year amounted to 487.3 litres; 699.1 litres were discarded due to mastitis.

15.3.5. *Development*

During the year one mixer make "Gehl 170", 1 Ensilage Cutter and 2 tractors Model MF 135 were received.

15.3.6. The construction of the Dairy Unit was still going on at the end of the year. The first wing was completed. The second wing, work was continuing, the floor already cast and slats laid. A bunker silo was also constructed.

15.4. PALMAR LIVESTOCK BREEDING STATION

15.4.1. *Milch Cattle*

At the end of the year the Palmar Livestock Breeding Station carried a total of 118 head of cattle — 3 sires, 7 young bulls, 26 bull-calves, 60 cows, 8 heifers and 14 heifer-calves. There were 37 calvings during the year — 20 males and 17 females. The average birth weight was 23 kgs and weaning weight at 90 days 62 kgs.

Sale : 2 bulls and 5 cows were sold for slaughter..

Death : 2 young bulls and 11 calves died during the year.

Transfer : 2 sires were transferred to the Division of Veterinary Services.

2 cows and 2 calves were received from Flacq Demonstration Centre and Mapou Demonstration Centre.

15.4.2. *New Zealand Cattle*

At the end of the year the Station carried a total of 526 head of New Zealand Cattle — 14 sires, 108 young bulls, 29 bull-calves, 154 cows, 185 young heifers and 36 heifer-calves. There were 138 calvings during the year — 71 males and 69 females. Two cows gave birth to twins. 1 cow aborted and 3 cows gave birth to stillborn calves.

The Rural Development Project was maintained. 9 pregnant cows were distributed, 67 cows and 61 calves were collected from the cowkeepers.

Death : 12 cows and 48 calves died during the year.

Sale : 35 cows and 79 young bulls were sold for breeding; 276 cows, 5 bulls, 40 heifer and 40 young bulls were sold for slaughter.

Transfer : 1 sire was received from Richelieu Livestock Breeding Station.

15.4.3. *Herd Cattle*

At the end of the year there were 44 head of Ongle, 51 head of Boran and 279 head of Zebu cattle. The herd consisted of 5 sires, 23 bulls, 52 young bulls, 47 bullcalves, 74 cows, 133 young heifers and 40 heifer-calves. There were 112 calvings during the year — 56 males and 56 females.

Death : 22 calves, 2 cows and 1 heifer died during the year.

Sale : 16 bulls were sold to carters and 4 bulls, 4 cows and 1 heifer were sold for slaughter.

15.4.4. *Goat*

(a) Anglo-Nubian

At the end of the year there were 218 Anglo-Nubian goats on the Station — 72 males and 146 females. 148 kids were born during the year out of which 69 males and 79 females. The average weight at birth was 2.5 kg and average weaning weight was 16.2 kg at 122 days. 4 does aborted and 8 still-born were recorded during the year.

Death : 26 kids, 3 weaners and 8 does.

Sale : 17 males and 11 females were sold for slaughter.

Transfer : 34 young bucks and 5 young does were transferred to the Extension Services Division for sale to breeders throughout the country.

10 bucks were transferred to Rodrigues.

1 doe and 1 buck were returned from Flacq Demonstration Centre.

15.4.5. (b) *Jumna Pari*

At the end of the year there were 107 Jumna Pari goats on the Station, consisting of 30 males and 77 females. 54 kids were born during the year — 29 males and 25 females. The average birth weight was 2.5 kgs and the average weaning weight was 18 kgs at 120 days. 4 does aborted and 1 doe gave birth to still born.

Death : 13 kids, 1 young buck and 2 does died during the year.

Sale : 2 males and 4 females were sold for slaughter.

Transfer : 21 young bucks and 5 young does were transferred to the Extension Services Division for sale to breeders.

15.4.6. *Pigs*

(a) At the end of the year there were 116 pigs at the Station, consisting of 2 boars, 5 young boars, 27 sows, 25 gilts and 57 piglets. During the year 45 litters were recorded giving a total of 452 piglets and 60 stillborn. There were also 2 abortions. The average weaning weight at 8 weeks was 15.0 kgs.

Sale : 13 sows and 4 boars were sold for slaughter. 363 weaners were supplied to the Pig Credit and Marketing Co-operative Society.

Death : 3 sows, 2 gilts and 124 piglets died during the year.

Transfer : 2 weaners were transferred to the Animal Health Laboratory for further investigations.
3 boars and 4 gilts were received from Curepipe Livestock Breeding Station.

15.4.7. (b) *Parent Stock*

In November, 1977, 8 female weaners and 4 male weaners of Wessex Saddle Back were received on the Station from the Republic of Seychelles.

15.4.8. *Rabbits*

The small unit of rabbit was maintained. At the end of the year the Station carried a total of 42 rabbits — 4 males, 11 females and 27 rabbitlings. During the year 56 rabbitlings were born.

Death : 29 rabbitlings died during the year.

Sale : 3 males and 3 females were sold to small breeders.

15.4.9. *Milk Production*

During the year 77931.4 litres of milk were produced. The average yield per day per cow was 4.6 litres. Out of the total milk produced 37,672.0 litres were fed to calves, piglets and kids; 21,900 litres were sold to Ministry of Health and 18,305.7 litres were sold to staff. 4.0 litres were taken by the Ministry of Health for analysis and 49.7 litres were lost during decantation and handling.

15.4.10. *Miscellaneous*

During the year manure was continued to be sold to the Public and the Development Works Corporation. By the end of the year 1,513 tons were sold and 86 tons were issued to other Divisions.

In view to increase the fodder produced on the Station, 10 arpents have been planted with Sugar cane and Elephant grass.

In April, 35 Citrus grafts were planted. 3,261 coconuts were sold and 694 coconuts were sent to Abercrombie Nursery for seedlings production.

15.4.11. *Development*

Dairy Unit

The roof of the first wing has been completed. Gates were yet to be provided and fixed. The second wing, work was continuing — the floor and drains already cast. All reinforcements for columns were already fixed in position and were cast.

The floor of one of the herd paddocks had been cast and new feed troughs made. Only the covered part was yet to be completed.

15.5 POULTRY BREEDING CENTRE — REDUIT

15.5.1. The Poultry Breeding Centre maintained parent stock of Sykes Ranger and Skyes Tinted from Ross Poultry Limited for the production of Layers. In addition the centre maintained Ross I Broiler parent Stock for the production of broiler chicks.

15.5.2. During the year the poultry Breeding Centre hatched 127,348 chicks, 42,805 day-old pullets, 5,196 month-old pullets, were sold to poultry keepers for egg production.

15.5.3. To help the production of poultry meat 22,917 day-old broilers and 51,937 male chicks from laying stock were sold. 4,610.800 kgs of dressed chickens and culls were sold for table. The centre also provided 24 chickens to the Animal Health Laboratory for the testing of vaccine, 120 month-old pullets to the Extension Services.

15.5.4. *Hybrid Sykes Ranger*

A total of 69,173 hybrid. Sykes Ranger Chicks were produced, of which 28,636 day-old pullets, 2,979 month-old pullets, 34,952 day-old cockerels and 96 month-old cockerels were sold for eggs and poultry meat respectively.

15.5.5. *Hybrid Sykes Tinted*

A total of 33,402 hybrid Sykes Tinted were produced, of which 13,919 day-old pullets, 1,917 month-old pullets, 16,861 day-old cockerels and 28 month-old cockerels were sold.

15.5.6. *Broiler chicks*

A total of 24,773 broiler chicks were produced of which 22,917 were supplied to small poultry keepers.

15.5.7. *Egg Production*

During the year 312,248 eggs were produced at the Poultry Breeding Centre. The monthly production of various breeds maintained during the year was as per "Appendix" 'A'.

15.5.8. Out of the 312,248 eggs produced, 11,251 eggs carried forward from year 1976 28,948 eggs were sold for table, 219,664 eggs were incubated for the supply of chicks to the public, 2125 eggs were issued to the Animal Health Laboratory for vaccine production, 2640 eggs to the Artificial Insemination Laboratory and 66,970 eggs to the Ministry of Health, also for table. The stock in hand at the 31st December 1977 was 2255 eggs.

15.5.9. *Reproductive Performance*

During the year under review 127,348 chicks were hatched. The average fertility and hatchability were 79.23% and 57.68% respectively of all eggs set.

The monthly reproductive performance of all breeders were as per "Appendix B".

The monthly reproductive performance of all parent stock breedwise was as per "Appendix C".

15.5.10. *Import of Stock*

To meet the demand of Layers the following were imported from the United Kingdom.

(i) Sykes Ranger Parent Stock: 1067.

(ii) Sykes Tinted Parent Stock : 584.

For the production of broiler chicks 301 day-old Ross Parent Stock pullets and 47 day-old cockerels were imported.

15.5.11. *Animal Health*

The Poultry Breeding Centre carried an average of 10,232 birds of all ages on a monthly basis. The mortality in adult stock during the year was 7.69% and in the group 0-12 weeks the mortality was 12.0%.

APPENDIX A

RECORD OF MONTHLY EGG PRODUCTION 1977

<i>Month Breed</i>			<i>P.S. Ranger</i>	<i>P.S. Tinted</i>	<i>P.S. Ross broiler</i>	<i>Mixed hybrid</i>	<i>Total</i>
January	...	...	8,214	3,663	5,136	2,911	19,924
February	...	...	8,970	5,337	4,507	2,580	21,394
March	...	...	20,476	11,294	4,394	2,605	38,769
April	...	...	19,832	8,852	3,314	2,266	34,264
May	...	...	16,675	9,382	2,971	2,144	31,172
June	...	...	15,145	8,672	635	16,29	26,081
July	...	...	16,227	9,119	—	1,329	26,675
August	...	...	14,121	8,752	269	1,301	24,443
September	...	...	10,841	7,332	3,782	2,307	24,262
October	...	...	10,907	7,331	5,747	2,290	26,275
November	...	...	8,863	5,581	4,921	2,062	21,427
December	...	...	7,396	3,350	4,527	2,289	17,562
TOTAL			157,667	88,665	40,203	25,713	312,248

APPENDIX B

MONTHLY REPRODUCTIVE PERFORMANCE OF ALL BREEDS

<i>Month</i>		<i>No. of eggs set</i>	<i>No. fertile</i>	<i>No. of chicks hatched</i>	<i>% of fertility</i>	<i>% hatched of fertile</i>	<i>% hatched of all eggs set</i>
January	...	4,478	3,791	2,312† 3,056	84.65	80.61	68.24
February	...	11,623	9,367	6,446	80.59	68.81	55.45
March	...	24,713	19,544	13,663	79.08	69.90	55.28
April	...	23,094	19,953	16,339	86.39	81.88	70.74
May	...	28,054	23,587	19,291	84.07	81.78	68.76
June	...	21,274	18,551	14,790	87.20	79.72	69.52
July	...	21,536	19,282	16,218	89.53	84.10	75.30
August	...	25,313	22,140	17,009	87.46	76.82	67.19
September	...	18,564	13,746	6,714	74.04	48.84	36.16
October	...	18,469	12,649	6,326	68.48	50.01	34.25
November	...	18,598	8,241	4,561	44.31	55.34	24.52
December	...	2,925* 1,023	887	623	86.70	70.23	60.89
TOTAL		219,664	171,738	127,348	79.23	72.80	57.68

* Set in December 1977 chicks hatched in January 1978

† Set in December 1976 chicks hatched in January 1977

APPENDIX C

THE MONTHLY PERFORMANCE OF ALL PARENT STOCK BREEDWISE FOR YEAR 1977

Month 1977	P.S. Ranger					P.S. Tinted					P.S. Ross Boriler				
	No. of eggs set	No. fertile	No. of chicks hatched	% Fertility	% hatched	No. of eggs set	No. fertile	No. of chicks hatched	% fertility	% hatched	No. of eggs set	No. fertile	No. of chicks hatched	% fertility	% hatched
January	—	—	—	—	—	—	—	—	—	—	4,478	3,791	2,312†	84.65	80.61
February	4,952	3,918	2,319	79.11	59.18	2,290	1,525	959	66.59	62.88	4,381	3,924	3,168	89.56	80.73
March	11,761	9,160	6,472	77.88	70.65	8,268	6,463	4,351	78.16	67.32	4,684	3,921	2,840	83.71	72.43
April	15,705	13,705	11,320	87.26	82.59	4,509	3,947	3,194	87.53	80.92	2,880	2,301	1,825	79.89	79.31
May	17,693	15,312	12,401	86.54	80.98	7,268	5,875	4,940	80.83	84.08	3,093	2,400	1,950	77.59	81.25
June	13,138	11,382	9,301	86.63	81.71	7,585	6,740	5,158	88.85	76.52	551	429	331	77.85	77.15
July	13,759	12,269	10,326	89.17	84.16	7,777	7,013	5,892	90.17	84.01	—	—	—	—	—
August	15,479	13,465	10,580	86.98	78.57	9,834	8,675	6,429	88.21	74.10	—	—	—	—	—
September	9,159	6,565	3,281	71.67	49.97	6,438	4,484	1,304	69.64	29.08	2,967	2,697	2,129	90.89	78.93
October	7,983	4,821	2,195	60.39	45.52	5,585	3,451	854	61.79	24.74	4,901	4,377	3,277	89.30	74.86
November	7,676	2,200	978	28.66	44.45	5,274	1,339	321	25.38	23.97	5,648	4,702	3,262	83.25	69.37
December	—	—	—	—	—	—	—	—	—	—	1,023	887	623	86.70	70.23
TOTAL	117,305	92,797	69,173	79.10	74.54	64,828	49,512	33,402	76.37	67.46	37,531	29,429	24,773	85.04	76.32

* Set in December 1977 chicks hatched in January 1978

† Set in December 1976 chicks hatched in January 1977

XVI. Engineering Division

HEAD OF DIVISION: A. R. SATAR, PRINCIPAL AGRICULTURAL ENGINEER

16.1. The division consists of 3 sections:—

- (i) Farm Machinery
- (ii) Farm Building
- (iii) Irrigation, Soil and Water conservation

16.2. The Farm Machinery section is responsible for the design of Agricultural Equipment, testing of imported equipment and carrying out modifications if necessary and advise other divisions on the choice of equipment. Repairs and maintenance of all vehicles and equipment, manufacture of structural members for farm buildings and furniture are carried out in the workshop. This section is also responsible for the installation of all equipments on experimental stations and pumps and piping systems for the Irrigation Section.

16.3. The Farm Building Section is responsible for the design and construction of office and farm buildings.

16.4. The Irrigation and Soil and Water Conservation Section is responsible for research and design in the field or irrigation, soil conservation and drainage. This section has carried out the design of irrigation systems for the Small Scale Irrigation Scheme. Irrigation facilities are provided to plots of 10-15 acres belonging to small planters, where underground water is available.

16.5. FARM MACHINERY SECTION

The number of vehicles and equipments and their maintenance and repairs were as follows:

Item			Number at 31/12/76	Addition during 1977	Deletion during 1977	Existing on 12/12/77	Servicing and Repairs
Lorry	...	...	19	Nil	2	17	285
Van	...	...	24	1	4	21	299
Land Rover	...	...	17	Nil	3	14	252
Car	...	...	12	4	2	14	118
Tractor	...	...	28	7	Nil	35	150
Motor Cycles	...	...	11	Nil	3	8	15
Lawn Mowers	...	...	73	4	9	68	252
Sprayers (Motorised)	...	...	71	4	3	72	50
Sprayers (Hand)	...	...	130	2	28	104	50
Implements	...	...	34	10	Nil	44	14
Broomwade Compressor	...	...	3	Nil	Nil	3	9
Pumps	...	...	15	3	1	17	10
Concrete Mixer	...	...	4	Nil	Nil	4	4
Feed Mixer	...	...	Nil	2	Nil	2	1
Dumper	...	...	1	Nil	Nil	1	3
Weighbridge	...	...	4	Nil	Nil	4	1
Workshop Tools & Equipments	...	...	44	2	Nil	46	24

The following were manufactured:

38 Tubular Steel Divisions for feed lot, 44 roof Trusses for feedlots, 1 Molasses Tank, 18 Canopy frames for tractors, 94 Brackets, 101 gates for feedlots, 240 Hinges, 26 Aprons for Poultry Section, 3 Stevenson Screens, 21 Stands for sprinklers, 15 Risers for sprinklers, 36 Eye Bolts and washers, 112 Studs, 72 Base plates, 12 U-Frames for drainage channels, 1 Sliding door and rollers, 6 Flanges and 1 screw for irrigation hydrant, 2 Dipsticks for Fuel Tanks at Réduit, 1 Screen for reservoir at Barkly Experiment Station, 4 Tarpaulins for tractors, 1 Stand for Printing Machine, 1 Lifting Device for installation of Irradiator, 1 Balustrade for staircase, Besides the following works were carried out: 6,331 feet of purlins were fixed, 36 couplings were fitted to portable Alluminium Pipes, 1 Trailer Body was completely repaired, 1 Irradiator was installed at Réduit, 1 Pump for Bauer Slurry Tanker was completely overhauled 1 Balustrade for staircase installed, 1 Silage harvester completely overhauled, 3 weighing machines repaired, 3 compressors removed from milk centres, 1 Boiler installed at Curepipe Experiment Station, 1 Weighbridge installed at Curepipe Livestock Breeding Station and Irrigation Pipeline modified at Richelieu Experiment Station.

16.6. *Mechanisation of Land Preparation for Rice Planting*

Puddling of paddy field was carried out in two fields with a tractor fitted with cage wheels and a rotavator fitted with a levelling board. The quality of the work was very good and a slightly higher yield was obtained compared to yield obtained from adjoining fields prepared by hand driven power tillers.

16.7. An Alvan Blanch Mobile Thresher received during the year was found to be defective. The speed of the blower was too slow for the correct speed of the drum and when the blower was set to its correct speed the speed of the drum was too high. The pulley combination was replaced and the equipment is now performing well.

16.8. *Farm Building*

Architectural Plans and Working Drawings were prepared for the following:

- (i) Office and Scale Room for Weighbridge at Richelieu Experiment Station
- (ii) Pump House at Richelieu Experiment Station
- (iii) Effluent Disposal System at Richelieu and Palmar Livestock Breeding Centres
- (iv) Additional Office Accommodation for Finance Division
- (v) Milking Parlour, Bull and Maternity Pens at Richelieu and Palmar Livestock Breeding Stations.

- (vi) Milk Room at Richelieu and Palmar Livestock Breeding Stations
- (vii) Quarantine Accommodation for Poultry Breeding Centre at Curepipe Livestock Breeding Station.
- (viii) Molasses Tank at Richelieu and Palmar Livestock Breeding Stations.

16.9. The following buildings were handed over: (a) Office and store, Poultry Breeding Centre, (b) additional accommodation for Finance Division.

16.10. 3 Milk Collecting Centres were repaired. At Belle Vue Farm, a septic tank was constructed, a concrete floor of an area of 1,500 ft was cast to provide additional floor area for sun drying of paddy, the construction of an Implement Shed has started and it is expected to hand over the building in April 1978.

16.11. Staff of this Division supervised the work carried out by labour from other Divisions namely construction of feedlots, trench, silos and Milking Parlour.

IRRIGATION AND SOIL AND WATER CONSERVATION

16.12. *Improvement of Irrigation System at Richelieu Experiment Station*

10 sprinklers of 40 gpm were provided for the irrigation of sugarcane. 24 aluminium pipes 4" diameter and 45 pipes 3" diameter were modified to fit in the new system.

16.31. *Belle Vue Farm*

An overhead irrigation system has been installed for the irrigation of sugarcane and rice in the inter-rows. The system consists of a 5.5 HP Diesel Pumping Set and 5 sprinklers of 26 gpm each.

16.14. *Réduit Experiment Station*

A 25 HP Electric Pumping set with a duty of 220 gpm at 160 ft. head was installed on the station.

16.15. *Barkly Experiment Station*

29.5 HP Electric Pumping set with a duty of 150 gpm at 180 ft. was installed.

16.16. *Research in Water Requirements and Frequency of Irrigation*

An overhead irrigation system has been designed to enable the Agronomy Division to carry out experiments in water requirements and frequency of irrigation for tomato, tobacco and bean.

16.17. *Small Scale Irrigation Scheme*

An overhead irrigation system has been designed for the Ministry of Co-operatives at La Ferme. It covers an area of 100 acres and water will be obtained from the pipeline from Pierrefonds to Coromandel. Working drawings and contract documents have been prepared. The scheme is financed by the French Government.

XVII. Field Services Division

HEAD OF DIVISION: M. M. SOOLTANGOS, AGRICULTURAL
SUPERINTENDENT

17.1. The Field Services comprised the following sections:

1. Transport Section
2. Livestock Feed Factory
3. La Brasserie Fodder Station
4. Nouvelle Decouverte Station
5. Cowfeed Subsidy Scheme
6. Réduit grounds and buildings
7. Labour Coordination
8. Réduit Canal (Syndic)

Transport Services

17.2 Eighty vehicles (80) comprising tractors, jeeps, vans, lorries and cars serviced the various divisions of the Ministry.

17.2.1. The vans, jeeps and cars were mainly utilised for the conveyance of officers, field staffs, foreign technical advisors and specialists and for group tours, audiovisual shows, service to livestock breeders, payment of wages and salaries to personnel employed on outstations.

17.2.2. Tractors and lorries were utilised for field operations and transport of stores and feeds.

The Livestock Feed Factory

17.3.1. Livestock feeds manufactured at the factory were partly utilized by the government breeding stations and partly for sale to the public.

17.3.2. The total amount of feeds produced was 4,070 tons 050 kg. representing a sale value of Rs 5,277,114.16 cs.

17.3.3. The table below shows the amount of the different types of feeds manufactured, their sale price and total sale value.

<i>Type of feed</i>				<i>Total Production</i>	<i>Sale price/ 1000 kg.</i>	<i>Total Value Sale</i>
Poultry feed	...	...	...	646,620	1731/ton	1,119,299.220
Chick feed	...	...	...	108,845	1855/ton	201,907.475
Pig grower	...	...	...	243,050	1484/ton	360,686.200
Pig starter	...	...	...	80,000	2235/ton	180,588.000
Creep feed	...	...	...	9,745	1847/ton	17,999.015
Bull feed	...	...	...	37,650	1603/ton	60,352.950
Calf feed	...	...	...	9,250	1970/ton	18,222.500
Horse feed	...	...	...	94,500	1724/ton	162,918.000
Special horse feed	...	...	...	151,000	1867/ton	281,917.000
Rabbit feed	...	...	...	14,220	1723/ton	24,501.060
Cowfeed	...	...	...	2,659,090	1062/ton	2,823,953.580
Mineral Mixture	...	...	...	1,120	1776/ton	1,989.120
Dairy Supplement mixture	...	...	...	14,160	1608.76/ton	22,780.041
						5,277,114.161

LA BRASSERIE FODDER STATION

17.4. The station remained the main source of fodder supply to Curepipe Livestock breeding station and Réduit Veterinary Service. Fodder was also occasionally supplied to Richelieu feed lots and Palmar Breeding Station. The Prisons Department also called at times of scarcity of fodder.

17.4.1. Total fodder supplied amounted to 3,122 T 327 kg., distributed as follows:

Curepipe Livestock Breeding Station	...	2,062 tons	677 kg.
Veterinary Services Division	...	322 tons	650 kg.
Palmar Breeding Station	...	35 tons	—
Richelieu Feedlot	...	32 tons	—
Richelieu Prisons	...	130 tons	—

NOUVELLE DECOUVERTE STATION

17.5 Activities on the station centred on the care and maintenance of an area of about 9 arpents under mulberry plantations, an area of about 12 arpents under fodder grasses and the production of some vegetables and crops. Some 200 tons of fodder were supplied to the Veterinary Services Division at Réduit. Mulberry leaves were collected by the Sericulture Section of the Entomology Division and mulberry cuttings were supplied to the Forestry Services. Vegetables produced were sold to labour and staff of the station.

THE COWFEED SUBSIDY SCHEME

17.6. Sale of cowfeed under the Cowfeed Subsidy Scheme was effected at 25 sale centres spread across the country. About 7,750 cowkeepers have registered themselves for the scheme and a total of 842,205 kg. of feed were sold at the sale centres.

17.6.1. Another type of cowfeed, a bagasse/molasses mixture, prepared specially for the Ministry by St. Antoine Sugar Estate, was also sold at cow-feed sale centres at the subsidised price of 23 cs $\frac{1}{2}$ kg. Some 605,540 kg. of the mixture were sold.

RÉDUIT GROUNDS-BUILDING AND WORKSHOPS

17.7. The grounds around the Head Office were maintained throughout the year.

17.7.1. The Blacksmith and carpentry workshops provided service to all divisions of the Ministry on various odd jobs, such as maintenance, repairs and extension to buildings, supply of furniture, repairs to water pipes and taps, agricultural equipment, running and maintenance of irrigation equipment.

LABOUR COORDINATION

17.8. The occasional and seasonal labour requirements of the different divisions was centrally coordinated.

RÉDUIT CANAL (SYNDIC)

17.9. The management of the canal remained the responsibility of the Field Services Division. Repairs to the canal and general maintenance were effected to ensure a regular flow of water in the canal for water users.

XVIII. Extension Service Division

HEAD OF DIVISION: S. P. MAUREE, ACTING DIVISIONAL SCIENTIFIC OFFICER, UP TO 13.3.77

G. NAIDOO, ACTING DIVISIONAL SCIENTIFIC OFFICER FROM 14.3.77

18.1. *Movement of Staff:—*

(a) The following officers went on study leave during the year:

1. Acting Divisional Scientific Officer, S. P. Mauree proceeded for higher studies in Australia in March for a period of 2 years. Scientific Officer G. Naidoo from the Animal Production Division acted as Divisional Scientific Officer (Extension) for the remaining part of the year.
2. Scientific Officer (Crop Extension) K. Ramdoyal left in October for higher studies in France. Scientific Officer O. Bissonauth joined the Extension Division on 19th November coming from the Agronomy Division
3. Technical Officer R. Kandhai followed a two months course in Egypt in Animal Production as from July.
4. Senior Technical Officer N. Teeluck attended a 3½ months course on Audio Visual Aids in London as from April.
5. Senior Technical Officer I. Sassa attended a 9 week course on Extension in Australia as from April.

- (b) Scientific Officer K. Ramdoyal left for Tanzania in August to attend a 12-day "Rural Technology Meet".
- (c) At the Technical Officers' level, Technical Officer Bachraz joined the Division on 31st October, in replacement of Technical Officer Allykhan who was transferred to Barkly Experiment Station on 25th October.
- (d) Senior Technical Officer, D. Dumur left on vacation leave in July, and has not reported for duty since. With the subsequent transfer of Mrs. F. Ciechanowski to the Field Services Division on 25th October, there was no Senior Technical Officer to supervise the work in Grand Port and Savanne districts. At 31st December, no replacement had been appointed.
- (e) Agricultural Superintendent A. Ferrière left on 3 months' vacation leave prior to retirement on 1st October. No replacement was appointed at 31st December. Crop and Livestock Extension will henceforth be merged and will not function as separate units.
- (f) Agricultural Superintendent B. Nundloll from Projects Division replaced Agricultural Superintendent S. P. Vythilingum in June when the latter went on a one month sick leave.
- (g) All the five Senior Field Assistants who were engaged in work with Agricultural Youth Clubs were transferred to other Divisions on 1st October. The Technical Officer will henceforth deal with all forms of Extension Work in his area.

18.2. *Visit to Planters and Breeders*

13,318 field visits were paid to planters during the year. Contact was established with 1,564 new planters. 276 home visits were also paid during the year. 2,444 visits were to cowkeepers rearing New Zealand Cattle, and 1,510 visits were paid to those having Creole cows. 935 visits to goat keepers, 1,486 visits to rabbit keepers. 17 visits to pig breeders and 30 visits to poultry keepers were paid during the year. Technical advice was given to farmers during these visits by the Extension Officers.

18.3. *Group Meetings*

218 evening meetings with planters were held and attracted an audience of 2,596. 86 evening meetings with breeders were held and were attended by 1,334 persons. The meetings were announced on radio/TV to have a larger audience. Topics covered during these meetings were the following:

1. Sugarcane cultivation, Pulvinaria and interline cultivation of food-crop; sugarcane fertilisation and weed control, maturity behaviour.
2. Cultivation of creepers, brinjal, chillies, tomato, groundnut, maize, fruit trees, bean, potato, etc., their pests and disease control.
3. Kitchen gardening

4. Crop cycle and agriculture in education.
5. Husbandry of the cow, rabbit, goat, pig and poultry (covering housing, feeding, milking, care of young, etc.).
6. Role of Agricultural Youth Clubs in increasing food production.
7. Role of water in agriculture.

18.4. *Demonstration of Farmers' Lands*

50 demonstrations were carried out on planters' lands and included application of fertilisers, pesticides in main crops, as well as pH correction of soil. On the livestock side, 3 demonstrations on sexing the rabbit were held. In addition, Extension Officers gave technical guidance on the improvement of cowbyres using simple and cheap materials. In addition conducted tours were held including one at the request of Mauritius Sugar Industry Research Institute at Belle Vue in August where planters were able to assess for themselves the difference in yield between local and imported potato seeds.

18.5. *Farmers' Competition*

Award of 40 prizes for the Potato Growing Competition held in 1976 was carried out in October in the Auditorium of University of Mauritius and on the same occasion 198 prizes were distributed to Agricultural Youth Club Members for competition in Rabbit Keeping, Kitchen Gardening held early in the year. The prizes were awarded by the Honourable Parliamentary Secretary of the Ministry of Agriculture and Natural Resources and the Environment. The National Winner for the Potato Competition was Mr. C. Chakoree of Mare Tabac who obtained a yield of 20.7 tons per arpent; for the Agricultural Youth Clubs, Espérance Trebuchet bagged the prize for best club. Materials for construction of rabbit hutches were also donated to the Agricultural Youth Clubs on that occasion by the representative of the Ambassador of U.S.A. Government.

18.6. *Statistics and Surveys*

- (a) *Data on acreages and yield of crops were recorded monthly.*
- (b) Collection of market prices of vegetables and fruits were done weekly.
- (c) Data on cost of production of March setts was noted during the last quarter of the year.
- (b) Foliar diagnosis of sugarcane belonging to small planters was performed by Technical and Senior Technical Assistants from the Control Board who were attached to the Extension Division during the inter-crop season.
- (e) A survey on the impact of Radio/TV agricultural programme on the farming community was started on 16th May. The enumerators numbered 60, and grouped Senior Technical and Technical Assistants of Control Board, Field Assistants and Agricultural Trainees. Out of the selected sample of 2,160 small sugarcane planters who

were interviewed, 542 were non-respondents, reasons given being death, untraceable, unknown, left for abroad, etc. The Survey Committee chaired by the Principal Agricultural Officer (Development) decided to reinterview a sample of 82 out of the non-respondents and this was conducted in the last quarter of the year. Out of the 82 interviewed, there were 34 respondents. All the completed questionnaires were being processed at the Data Processing Division, and the results in the form of tabulations were being awaited from that section.

18.7. *Agricultural Youth Movement*

The Division continued to give active support to Agricultural Youth Clubs. The number of Agricultural Youth Clubs in existence at 31st December 1977, was 64.

Weekly lectures were delivered to members as from April 16th by Extension Officers. Topics were as follows: (a) Soil and its preparation; (b) Seeds, seed beds, sowing, transplanting; (c) Fertilisers; (d) Plant propagation; (e) Pests and their control; (f) Diseases and their control; (g) Sprayers, precautions, etc.; (h) Potato cultivation; (i) Onion and garlic; (k) Kitchen gardening; (l) Nutrition in livestock production; (m) Management, feeding, breeding of farm animals; (n) Rabbit keeping; (o) Assessment.

With the transfer of the Senior Field Assistants engaged in Youth work in September, work with Agricultural Youth Clubs was reorganised. Every Technical and Senior Technical Officer was allocated a certain number of clubs in his district for which he was responsible for the technical work, whereas Technical Officer (Youth), was concerned with the organisation aspect of work with Youth Clubs, which included monthly meetings at district level of all clubs. The first meeting was held at Flacq Demonstration Centre for clubs of Flacq district in November. The second meeting was held at Plaisance Demonstration Centre on 10th December for clubs belonging to Grand Port district.

Moreover, all clubs which participated in the Kitchen Garden Competition held in 1977 benefited from free seed distribution. A leadership training course for members was held at Pointe Jérôme Youth Training Centre.

18.8. *Agricultural Information and Audio Visual Units*

These units continued to play their role in the dissemination of agricultural information to farmers, through talks, film shows and pamphlets. 33 weekly TV agricultural talks were delivered during the year and 42 Radio talks were held. 7 Scheduled TV Talks were cancelled by MBC/TV for various reasons. The topics covered were the same as for evening meetings. Special talks were delivered on TV and Radio on "Le pou à poche blanche" Pulvinaria Iceryi owing to the attack of that insect pest on the sugarcane plantation this year.

18.9. 16,070 copies of Farming News were printed and distributed among members of the Farming Community.

18.10. The revised edition of "Guide de Culture Vivrières et potagères" appeared in the month of October and the booklets were being sold to the public at Re 1.00 per copy.

18.11 Booklets from Mauritius Sugar Industry Research Institute on Potato, groundnut, maize and sugarcane were also distributed among planters.

18.12. Other leaflets covering both crops and livestock were distributed as well.

18.13. A pamphlet on the Extension Service Division was prepared on request and submitted to the Ministry of Information in view of the preparation of a brochure on the Extension Division.

18.14. *Pulvinaria and Rhinoceros Beetle*

A survey carried out by Extension Officers indicated that at 1st July 926 arpents of small planters' cane were affected by Pulvinaria, mostly to a mild degree.

18.15. Following reports in the press that there was a severe attack of Rhinoceros beetles on a coconut plantation, the Division kept a close watch on the situation which eventually did not prove to be alarming.

18.16. *Release of New Cane Varieties*

The new varieties Triton, M 594/62 and M 555/60 were released for sale. The Division informed planters of these varieties via field visits and conducted tours. Eventually, some planters purchased these varieties for planting. These three varieties have also been grown on the four Demonstration Centres of the Division.

18.17. *Onion Shortage*

An acute shortage of onion on local market occurred during August. It was felt that the Ministry should produce some seeds for sale to planters to prevent the same situation from recurring. Consequently, $\frac{1}{4}$ lb of local onions seeds was planted on every Demonstration Centre for March setts and these will then be planted to produce bulbs and eventually seeds.

18.18. *Travelling Allocation*

For the current session 1977-78, Rs 110,000 was allocated to the Division for the travelling of 85 officers. This amounted to an allocation of 225 miles per officer which proved quite inadequate for proper Extension work. In November an additional sum of Rs 45,000 was disbursed which has helped in restoring the efficiency of the Division to a great extent.

18.19. *Redundant Staff*

Since some time most of the Demonstration Centres have been over-staffed, and a detailed list of redundant labourers was prepared for necessary redeployment for more efficient utilisation of our labour force.

18.20. *Livestock on Demonstration Centres*

It has been decided that all cows on Demonstration Centres be returned to Livestock Breeding Stations and all poultry be sold. Goats and rabbits however will continue to be kept on the Demonstration Centres.

18.21. *Agricultural Zoning*

Now that for the first time, the Extension Service is adequately staffed, it is proposed to divide the island into 25 agricultural zones each under one Technical Officer who will deal with all forms of extension activity in his zone. Each zone will be subdivided into 10 sub-zones, each of which will be visited on two specific days each month. There will thus be 250 sub-zones. The zoning will be mostly based on factory areas, and each zone will represent more or less an equal number of planters.

18.22. *Opening of New sub-Offices*

It is proposed to open new sub-offices, one for each zone where it is proposed to post one Field Assistant full time to act as liaison between planters and the Technical officer in the area. Repairs to some former milk collecting centres were under way and they would subsequently be used as sub-offices. One sub-office was opened in October at Rose Belle (ex-Railway Quarters) which replaced the previous office at Baramia.

18.23. *Apiculture*

It was felt that apiculture offered interesting prospects for the small farmer and that the Division should encourage this activity. In this connection, the Acting Divisional Scientific Officer established preliminary contacts with local beekeepers, and it was planned to make greater efforts in the coming year for the promotion of apiculture.

18.24. *Sericulture*

The Division continued to pass on preliminary information to farmers who were keen to engage in sericulture. For detailed information on sericulture, they were referred to the sericulture unit in Réduit.

18.25. *Tractor Service*

The Division served as a link between planters and the Sugar Planters' Mechanical Pool by transmitting requests of sugar planters for tractor service to the pool.

18.26. *Talks within the Division*

- (a) On 30th June, Technical Officers Ragobur, Santchurn, Gunesh and Bisnauthsing talked to the staff on Extension philosophy, principles and practices. These talks were followed by a group discussion.
- (b) On 29th September, talks were given by Scientific Officer K. Ramdoyal, Senior Technical Officers I. Sassa and N. Teeluck and by Technical Officer R. Kandhai on their short training period abroad.

18.27. *Demonstration Centres*

Demonstration Centres continue to be the focal points for rural extension work. They demonstrate to farmers new techniques and practices. Vegetables and vegetable seeds are sold to the public. Sale hours at Demonstration Centres are now from 12 — 2 p.m. Normal visiting hours are between 1 — 3 p.m. On three days of the week, the Technical Officer is in attendance to meet farmers and to show them round.

18.28. *Staff Meetings*

Staff meetings at regional level were now being held every Saturday, while centrally, staff meetings were being held every Tuesday.

18.29. At the regional staff meetings which was being conducted by the Officer in charge of district or region, all the regional field staff attended. The central staff meetings were chaired by the Divisional Scientific Officer, and were being attended by the officers in charge of district or region, as well as by the staff at Réduit Extension Office.

The following tables were prepared from data collected by the Division.

TABLE 18.1
ESTIMATED FOODCROP PRODUCTION IN 1977

Crop	Area Harvested (arp.)		Estimated Average Yield (kg/arpent)		Estimated Total Commercial Production (metric tons)	
	1976	1977	1976	1977	1976	1977
Maize ...	1500	1261	1056	1053	1584	1328
Manioc ...	36	30	7222	7533	260	226
Arouilles ...	32	25	4281	4360	137	109
Sweet Potatoes ...	16	6	5187	4666	83	28
Groundnuts ...	897	505	1282*	1443*	1150	729
Irish Potatoes ...	1868	1702	6394	6407	11944	10905
Beans & Peas ...	644	528	1416	1507	912	796
Pine Apple ...	160	91	3906	4428	625	403
Brinjal ...	86	109	5651	5541	486	604
Tomatoes ...	1343	1746	4049	3967	5439	6928
Ginger ...	132	54	6257	6351	826	343
Creepers ...	878	819	6458	6054	5671	4959
Mixed Vegetables ...	1199	834	5538	5930	6641	4946
Banana ...	832	810	9733	10054	8098	8144
Rice ...	243	109	1913	2522	465	275
TOTAL ...	9866	8629	—	—	44321	40723

The acreages shown above were effective acreages harvested and include the aggregate acreages of different crops grown on the same land in one year as well as food crops interplanted with sugarcane.

*Green weight

CORRIGENDUM

TABLE 18.1

ESTIMATED FOODCROP PRODUCTION IN 1977

<i>Crop</i>	<i>Area Harvested (Arp.)</i>		<i>Estimated Average Yield (Kgs/Arpent)</i>		<i>Estimated Total Commercial Production (Metric Tons)</i>	
	1976	1977	1976	1977	1976	1977
Maize ...	... 1,500	1,261	1,056	1,053	1,584	1,328
Manioc	... 36	30	7,222	7,533	260	226
Arouille	... 45	48	4,156	4,354	187	209
Sweet Potatoes	... 24	28	5,125	4,679	123	131
Groundnut	... 897	728	1,282*	1,503*	1,150	1,094
Irish Potato	... 1,868	1,702	6,394	6,407	11,944	10,905
Beans & Peas	... 644	583	1,416	1,503	912	876
Pineapple	... 176	137	3,903	4,431	687	607
Brinjal	... 129	141	5,651	5,567	729	785
Tomatoes	... 1,343	1,746	4,050	3,968	5,439	6,928
Ginger	... 132	81	6,258	6,358	826	515
Creepers	... 878	917	6,459	6,265	5,671	5,745
Mixed Vegetables	... 1,280	1,094	5,692	6,108	7,286	6,682
Banana	... 770	754	9,792	10,061	7,540	7,586
Rice	... 243	109	1,914	2,523	465	275
TOTAL	9,965	9,359	—	—	44,803	43,892

The acreages shown above were effective acreages harvested and include the aggregate acreages of different crops grown on the same land in one year as well food crops interplanted with sugarcane.

*Green weight

XIX. Projects Implementation Division

HEAD OF DIVISION: K. RAMDAURSINGH — DIVISIONAL SCIENTIFIC OFFICER

19.1. The main activities of the Division consisted of implementing Government's irrigation projects, namely Northern Plains Irrigation Pilot Project, Small Scale Irrigation Project, Northern Plains Irrigation Project and Western Coastal Region Irrigation Project.

19.2. Northern Plains Irrigation Pilot Project

For the year 1977 the Water Users' Co-operative Society extended its facilities to additional 12 Ha of land thus bringing the total irrigated area to 103.0 Ha (243 A). It is now well established among the planters that with irrigation there is a substantial increase in yield of cane and that the land can be put to maximum use.

19.3. It is observed from production figures of the last four years that a margin of 47 Tons/Ha (19 T/A) between irrigated and non-irrigated sugar cane fields was maintained.

19.4. It is also observed that farmers' interest in growing non-sugar crops had considerably increased from 3.8 Ha in 1976 to 11.5 Ha in 1977. The following table shows the extent of non-sugar crop cultivation.

TABLE 19.1

		Pure Stand	Yield T/Ha	Interline	Yield T/Ha
Tomato ...	...	6.1 Ha	10.7	1 Ha	7.1
Groundnut, maize	...	1.73 Ha	*		
Cucumber, water melon,				1 Ha	*
Tobacco ...	...	1.7 Ha	2369 kg		
Vochm, Ladies Fingers		0.6 Ha	†		

The increasing interest in diversification is due to availability of irrigation water and explained by higher prices of foodcrops, thus making the cultivation more profitable.

19.5. Irrigation Sequence and Rainfall

The total rainfall for the year was 1,287.5 mm as compared to 1,371.1 mm last year.

*figures not available

†harvest going on

RAINFALL RECORDED FOR PERIOD JANUARY 1977 TO DECEMBER 1977

	<i>Month</i>		<i>Rainfall more than 25mm</i>	<i>Monthly rainfall (in mm)</i>
January	...	...	4 times	210.0
February	...	...	2	229.2
March	...	...	—	7.3
April	...	...	2	116.8
May	...	...	3	117.8
June	...	...	2	73.4
July	...	...	2	118.8
August	...	...	—	27.6
September	...	...	—	34.7
October	...	...	—	19.0
November	...	...	—	37.2
December	...	...	1	120.0
				15 times 1287.5

19.6. The responsibility for the running of the project was still with the Water Users' Co-operative Society. The Society had 4 committee meetings and one general assembly for the election of office bearers.

19.7. The problems encountered by the Co-operative Society in the running of the scheme during the course of the year were :

frequent bursts of aluminium pipes (31)

breakdown of Target Master (7 times) and Starter (3 times)

frequent power cuts (42 occasions)

These problems had a severe consequence on the irrigaiton frequency i.e. the number of cycles were reduced to 9 as compared to 15, 15 and 13 for the year 1974, 1975, 1976 respectively.

18.9. On account of the frequent bursts of aluminium pipes, light steel pipes were tried with a view to determine their suitability and possible use in the major irrigation projects.

19.9. *Small Scale Irrigation Project*

Financing proposal to establish 6 additional units covering a total area of 262 hectares was approved by the French Government. A sum of 2 million francs was made available to finance these units which are situated at Rivière du Rempart, Schoenfeld, Cottage, Poudre d'Or and Plaisance.

19.10. Contacts with planters of Cottage and Poudre d'Or were established with a view to grouping them into Water Users' Co-operative Societies.

19.11. As regards the scheme at L'Espérance Trébuchet, the Water Users' Co-operative Society had not been running smoothly. Its problem had been that of management. The formula applicable by other Water Users' Co-operative is a budget whereby the planters are required to pay on a per Ha/annum basis. The formula takes into account the employment of a team of irrigators permanently, who would also be required to carry out farming operations, e.g. weeding, thrashing, etc. when no irrigation is needed.

19.12. In this Cooperative, the farmers, however, collect irrigation dues on a per-irrigation basis, with irrigation operations being carried out by daily-paid labourers. The disadvantages of this method are (a) irregular irrigation cycle — everybody wanting to apply at the same time; (b) refusal of irrigators to work on a day-to-day basis as during rainy days and harvest period they would be left unemployed; (c) postponement of irrigation by farmers on the slight indication of possible rainfall in order to avoid payment of dues.

19.13. This approach has a further disadvantage of restricting irrigation to only a few farmers who have got the skill and time to irrigate their fields on their own. Hence the irrigation unit (Phase I of L'Espérance Trébuchet Irrigation Scheme) did not make full use of the investment. Only an area of 13 Ha (30 arpents) out of 42.2 Ha (100 arpents) was irrigated. The beneficiaries were reduced to 13 planters who were mainly vegetable growers.

19.14. The implementation of the Phase II of the Scheme has been withheld awaiting a solution to the organisational problems. The help of the Ministry of Co-operatives and Co-operative Development was frequently solicited mainly for the organisation and management of the Water Users' Co-operative Society. Several meetings were convened to thrash out the problem. An emotional conflict among members of the co-operative still persisted.

19.15. Under French Technical Assistance the services of Mr. Jean Amelot, Engineer, were made available for the implementation of Small Scale Irrigation Project.

NORTHERN PLAINS IRRIGATION PROJECT

19.16. *Implementation of Stage I*

The Stage I of the Northern Plains Irrigation Project covers an area of 1800 hectares. It lies in the central area of the northern plains in the vicinity of Triolet region and the Pilot Project.

The work under Stage I have been divided into six parts, the description of which is as follows:

NP1 — Repairs to La Nicolière Feeder Canal

NP2 — Construction of diversion weirs modules, channels and pipeline on rivers Vacoas and Chevrettes

NP3 — Remodelling of Canal Structures

NP4 — Repairs and membrane lining of feeder canal

NP5 — Construction of outlet at La Nicolière Reservoir and steel pipeline connection to the existing head works

NP6 — Supply and laying of pipes

PHYSICAL PROGRESS

19.17. *NP1*

By December 1976, about 76% of the work were completed. This sub project is expected to be completed by February 1978.

19.18. *NP2 A and B*

At the request of the CWA a redesign of the River Chevrettes Diversion is being undertaken by Sir M. MacDonald & Partners with all survey work being carried out by the CWA.

As regards Contract NP2 B, above 60% of the work had been completed. It was observed, however, that progress was slow, due mainly to unfavourable weather conditions. The remaining 40% of the work, consisting mainly of pipe-laying and lining of canal, are expected to be completed by the end of March 1978.

19.19. *NP3 and NP4*

Tenders both from Local and International Firms were received. In September 1977, the contracts NP3 and NP4 (excluding NP4 A) were awarded and work was started.

19.20. *NP5 and NP6*

Draft tender document for contract NP5 was still awaited. Contract document NP6 was submitted for approval. During 1977 the ODM/CDC mission visited Mauritius and had agreed in principle the financing of works under contracts NP5 and NP6.

19.21. *Western Coastal Region Irrigation Project*

The Western Coastal Region Irrigation Project covers an area of some 6840 hectares and is divided into 5 systems, namely

<i>System</i>				<i>Acreage (Hectares)</i>
La Ferme	...	...	...	1472
La Chaumière	...	...	...	926
St. Pierre	...	...	...	1222
Magenta	...	...	...	1979
Palma Beau Songes	...	...	...	1241
TOTAL				6840

19.22. The contract for the detailed design for the "La Ferme" system was awarded to the firm "Société de Traction et d'Electricité". Works were undertaken and are expected to be completed by early May 1978.

19.23. The firm also undertook hydrogeological survey of the project area to investigate the water sources and availability and a study on the possible use of water, after power generation at Guibies, for irrigating the Northern sector of the project area. Draft reports thereon are under consideration.

RESEARCH

SCIENTIFIC OFFICER — D. DOMUN

19.24. Sugarcane (*Saccharum Officinarum*)

The Northern Plains Pilot Project experiment to compare the yield of irrigated and non-irrigated sugarcane (Var. M 13/56) was continued for the third ratoon. The results are summarized below:

Variable	Non irrigated	Irrigated
Cane height (cm) on 14.1.77* ...	76.5 $\pm$ 3.0	111.2 $\pm$ 2.5
Cane height (cm) at harvest (i.e. 15.7.77)	253.3 $\pm$ 3.6	287.7 $\pm$ 4.4
Girth (cm) of millable stalk at harvest ...	8.0 $\pm$ 0.2	8.9 $\pm$ 0.1
Number of millable stalks/stool at harvest	3.8	4.2
Fibre % cane at harvest ...	13.2	12.8
Pol % cane at harvest ...	14.08	14.21
Average cane yield (tons/arp.) ...	20.0	41.7
Average sugar production (tons/arp.) ...	2.82	5.93

The differences in cane height on 14.1.77 and 15.7.77 between irrigated and non-irrigated fields were very highly significant ($P=0.001$).

The girth of millable canes was greater for irrigated cane in comparison with non-irrigated and the difference was highly significant ($P=0.01$).

The following table shows a comparison of yield between irrigated and non-irrigated canes over the last four years:

CANE YIELD OF IRRIGATED v/s NON-IRRIGATED (1974-77)

	Yield (T/A) of non Irrigated	Yield (T/A) of Irrigated	Difference (T/A) between Irrigated and non Irrigated	% increase in yield	Remarks
1974 — (virgin) ...	21	39.5	$\pm$ 18.5	88	Rainfall below normal; irrigation started late.
1975—(1st ratoon) ...	11	31.5	$\pm$ 20.5	186	Rainfall below normal and affected by cyclone Gervaise
1976—(2nd ratoon) ...	35	50	$\pm$ 15	43	Rainfall slightly above normal
1977—(3rd ratoon) ...	20	42	$\pm$ 22	110	Rainfall normal

*Canes harvested in August and weekly measurements started as from 14.1.77

19.25. *Pomme d'amour* (*Lycopersicon esculentum* Mill)

A central composite design was utilized to determine an optimum water regime for pomme d'amour at Richelieu Experiment Station from April to July 1977. The yield for each treatment is tabulated below:

TABLE 19.4
YIELD OF POMME D'AMOUR

Treatment	Water application (in./wk)		Marketable yield in metric tons/ha
	pre-flowering (X1)	Post-flowering (X2)	
T ₁ ...	1	1.5	12.95
T ₂ ...	0.5	1	12.41
T ₃ ...	0.5	2	14.58
T ₄ ...	1.5	1	12.68
T ₅ ...	1.5	2	10.00
T ₆ ...	1	2.207	11.59
T ₇ ...	1	0.793	16.25
T ₈ ...	1.707	1.5	17.46
T ₉ ...	0.293	1.5	13.61

A second order response model was fitted to the data and the response was represented by the following equation

$$\text{Yield} = 14.174 + 0.143 X_1 - 0.89 X_2 + 0.737 X_1^2 - 0.202 X_2^2 - 1.21 X_1 X_2 \text{ (metric tons/ha)}$$

The response surface does not indicate a region of maximum yield over the space covered by the experiment. However, there is a stationary point for the irrigation regime given by 1.25 in/wk pre-flowering and 1.35 in/wk post-flowering.

Plotting yield contours indicate that irrigation of 1.5 in/wk or more has a depressing effect on yield. Further there are indications that increasing yields may be achieved by either of the following irrigation regimes:

- High irrigation pre-flowering followed by low irrigation post-flowering.
- Low irrigation pre-flowering followed by high irrigation post-flowering.

19.26. *French Beans (Phaseolus vulgaris)*

A spacing trial with a fixed water regime (1 inch/wk) was conducted at Richelieu Experiment Station from May to August 1977 to study the effect of six row spacings on the yield of tender pods. Seeds were sown at a distance of 4 inches in furrows. The results are summarized in table below :

TABLE 19.5

YIELD OF TENDER PODS

<i>Treatment</i>		<i>Spacing between furrows</i>	<i>Yield of tender pods (metric tons/ha)</i>
T ₁	...	10 in	16.13 c
T ₂	...	15 in	13.15 a
T ₃	...	20 in	13.38 a
T ₄	...	25 in	11.47 ab
T ₅	...	30 in	9.85 b
T ₆	...	15. in. between furrows leaving a distance of 25 in. every two furrow	12.26 ab

S.E. of treatment mean = ± 0.94

Treatments with letters in common are not significantly different at 5% level.

Treatment T₁ significantly outyielded the other treatments.

19.27. *Tobacco (Nicotiana tabacum L)*

A split-plot design was used to evaluate the effect of 3 water regimes (0", 0.5" and 1" per week after transplanting) and 3 Nitrogen levels (30 kg, 40 kg and 50 kgN per ha) on the yield of flue-cured tobacco variety NC 95 at Richelieu Experiment Station. Seeds were sown in mid-July and the seedlings transplanted at the end of August. The field was irrigated with 1 inch of water at transplanting and $\frac{1}{4}$ inch everyday for the next six days. The experiment is still in progress.

FIGURE 19 1

NORTHERN PLAINS IRRIGATION PILOT PROJECT

Comparative yields of canes: Irrigated v/s Non-irrigated

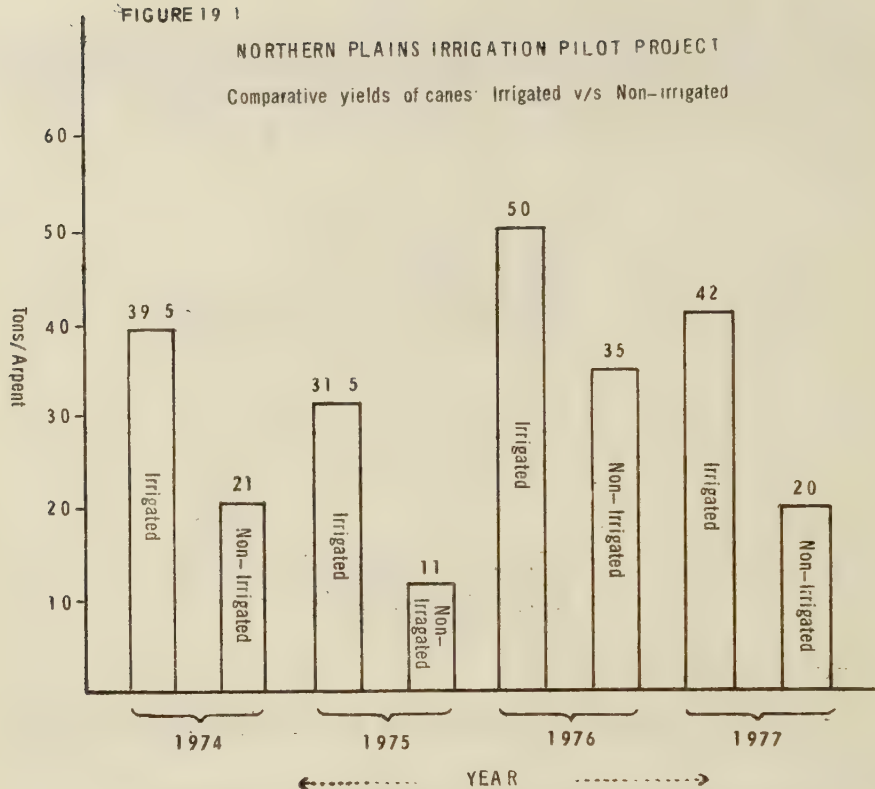
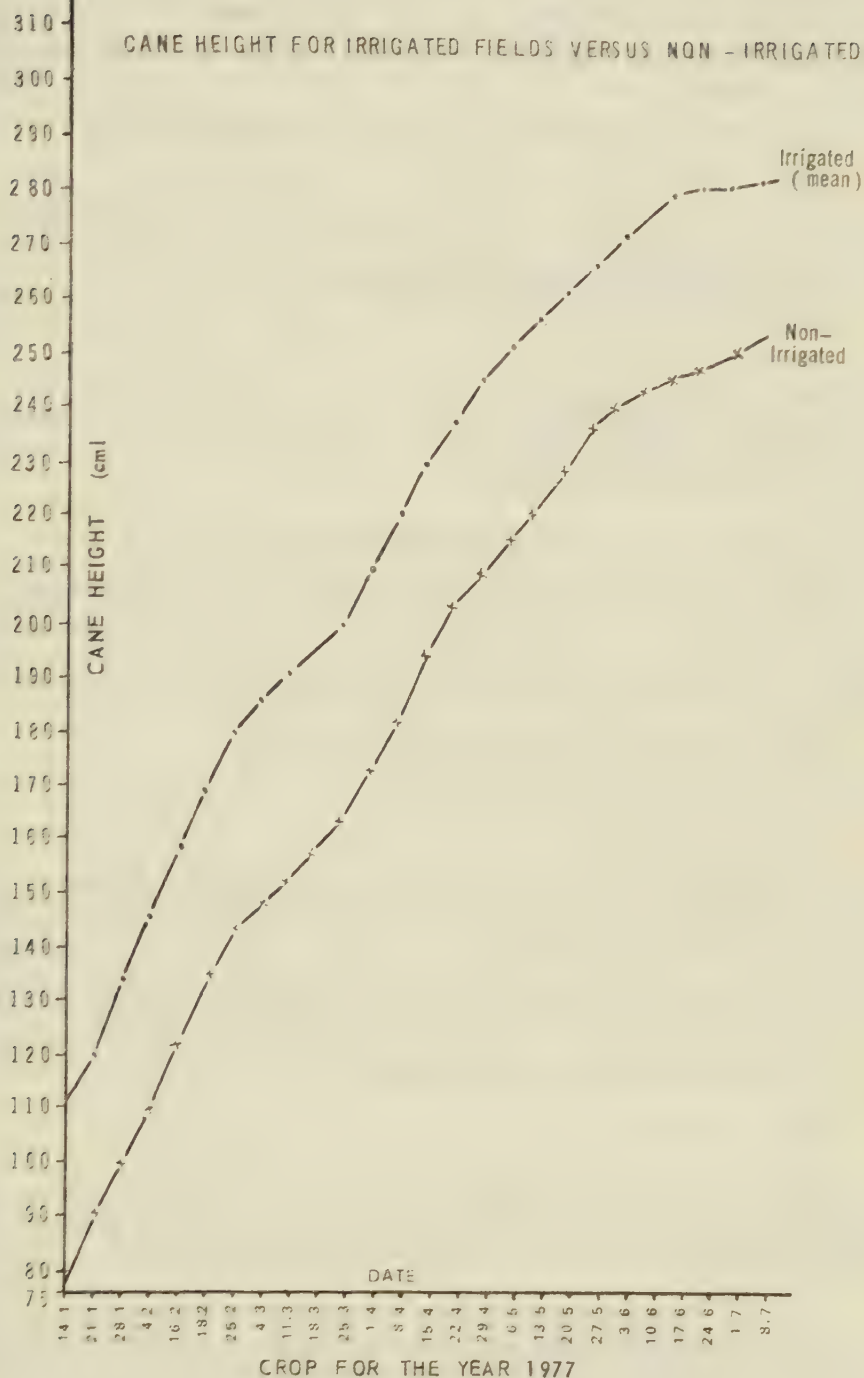


FIGURE 19 2

CANE HEIGHT FOR IRRIGATED FIELDS VERSUS NON - IRRIGATED



19.28. *List of Visitors*

Hon. Bussawon, Minister of Power, Fuel and Energy

Hon. Dongoor, Parliamentary Secretary, Ministry of Power, Fuel and Energy

Mr. Brown, General Manager, Mauritius Housing Corporation

Mr. Baux of La Caisse Centrale

Mr. P. Meinertzhagen, General Manager of Commonwealth Development Corporation

Mr. H. de Brock, Regional Controller CDC

Mr. Thwaites, Financial Analysis, CDC

Mr. Batty, Legal Adviser, CDC

Dr. H. Evans, Agronomist, FAO

Mr. Futzi, Engineer, BAD

Mr. Jarrick, Financial Adviser

XX. Land Use Division

HEAD OF DIVISION: P. OOGARAH, DIVISIONAL SCIENTIFIC OFFICER
UP TO 11.8.77

OFFICER IN CHARGE: J. R. N. GOVINDEN, SCIENTIFIC OFFICER FROM 12.8.77

20.1. The Land Use Division is responsible for:—

(a) Land Use and Soil Conservation.

(b) Land Settlements.

(c) Technical assistance in the execution of agricultural projects in the Rural Development Programme of the Ministry of Economic Planning and Development.

(d) Liaison between the Agricultural Services in Rodrigues and the Specialist Divisions of the Agricultural Services at Reunion.

(e) Matters relating to the environment.

20.2. *Land Use*

20.2.1. The Division's principal objective is to optimise the use of the very limited land resources of Mauritius. Particular emphasis is placed on natural land use and on the safeguard of good agricultural land.

20.2.2. There has been an increase in built-up areas mostly at the expense of agricultural land. Land Use implications of applications for subdivision of agricultural land for non-agricultural purposes were therefore carefully considered.

20.2.3. The Divisional Scientific Officer participated in a seminar organized by the Ministry of Housing, Lands and Town and Country Planning at the University of Mauritius on the occasion of the visit of Town and Country Planners from Reunion Island in March. The main topics discussed were aspects of Land Use planning in Reunion and the preservation of good agricultural land.

20.3. *Land Settlements*

20.3.1. There are in all 14 settlements under the control of the Division. They are situated at Petit Sable, Grand Sable, Belle Vue, Richelieu, Terre Rouge, Palmar, The Vale, La Cave, Plaisance, Papavert, Bee Manique, Buffer Zone, Moona and Elysee.

20.3.2. There are 680 tenants in all, the settlements and the number of holdings is 754. The area of each holding varies from 0.25 arpents to 4 arpents. Terre Rouge and Richelieu Settlements are supplied with irrigation water.

20.3.3. Rent collection was satisfactory. However, several cases of non-payment of arrears of rent had been referred to the Crown Law Office for necessary action. As from July 1977 the tenants have been charged the new rent proposed by the last Land Settlements Committee and approved by the Minister. The new rentals are as follows:—

- (1) Rs 165.—per arpent for land provided with irrigation water or for land in the humid zone, used for the cultivation of sugarcane.
- (2) Rs 120.—per arpent for land without irrigation or for land in the drier regions, used for the cultivation of sugarcane.
- (3) Rs 120.—per arpent for land used for the growing of foodcrops.

20.3.4. There was one meeting of the Land Settlement Committee. Cases of transfers and the question of renewal of leases were the main items considered. Now that the new rentals had been approved, it was agreed that the agreements be renewed. A new Land Settlement Lease Agreement has been prepared. The Committee approved 28 cases of transfer. It was the consensus that tenants should be prosecuted for non-payment and if they were found guilty the lease should be terminated.

20.4. *Rural Development Agricultural Projects*

20.4.1. The Rural Development Agricultural Committee under the Chairmanship of the Principal Agricultural Officer (Development) met once a month to follow up the progress of work in the rural development agricultural projects.

20.4.2. Follow-up of the cows distributed under the Rural Development Programme was continued by officers of the Livestock Extension Service and of the Animal Health Division. The Livestock Extension Officers

advised on animal nutrition and management in general and the officers of the Animal Health Division provided artificial insemination facilities and advice on animal health. The programme of cowshed improvement under the Technical Assistance and Supervision of the Livestock Extension Service continued.

20.4.3. The Extension Service also provided technical assistance in the Self-Help Projects—rabbit keeping and kitchen gardening. Fodder plantation was stopped.

20.5. *Rodrigues*

20.5.1. The Divisional Scientific Officer accompanied Mr. Roy, Chief Agricultural Officer, and Mr. Brunet, Principal Agricultural Officer (Livestock) on a mission to Rodrigues from 21st to 27th February 1977.

20.5.2. The Officer in Charge visited Rodrigues in December in connection with the Programme of Work of the Agricultural Services in Rodrigues.

20.6. *Research*

20.6.1. *Pentade Analysis of Rainfall and Irrigation Need.*

The main objective of this study was to find the mean rainfall and the 95% confidence limits of the mean for each pentade for the five sectors of the island. Evaporation (E_0) for each pentade was also considered with a view to show periods of likely water deficit or irrigation need.

20.6.2. Rainfall figures in pentades for the years 1961 to 1975 for the five sectors of the island published by the Meteorological Services were used. Abnormally high rainfall figures, presumably pertaining to cyclonic periods were excluded.

20.6.3. A normal distribution was assumed for the purpose of statistical analysis. The mean and the standard deviation of the mean for each pentade were computed. The 95% confidence limits for each pentade mean was taken as twice the standard deviation of the mean.

20.6.4. USWB pan evaporation figures are available for a few stations only. Therefore, the figures from Palmyre, Pamplemousses, Belle Rive and Plaisance were taken to represent sectors West, North, Centre and East and South respectively. Estimate of potential evaporation can be obtained by multiplying E_0 values by the appropriate crop coefficient.

20.6.5. Results show the pattern of rainfall distribution in terms of pentade means to be more or less similar for five sectors of the island although differences in intensity or amount of rainfall are evident. Pentade number 8 seems to be the wettest pentade. Another striking feature is the great variation of the mean rainfall figures; this would render the prediction of rainfall for a pentade difficult.

20.6.6. The need for irrigation in sectors North and West is evident and for optimum crop production throughout the year, there is a definite need for supplemented irrigation in the sectors East and South.

20.7. *Environment*

20.7.1. The Division has also dealt with matters relating to the Environment.

ENDA Seminar

A two-week seminar on 'L'Environnement des îles surpeuplées de l'ouest de l'Océan Indien' was organised jointly by the Ministry and the Environment Development Action (ENDA).

20.7.2. Delegates from Seychelles, Comores, Réunion and Mauritius participated in the seminar. The objective of the seminar was to define an inter-disciplinary approach on environmental problems common to the over-populated islands of the Indian Ocean. The main recommendations of the seminar were:—

- (a) systematize the approach to environmental problems by coordinating the methods and efforts;
- (b) compile systematically and comparatively all legislation on environment of the islands concerned;
- (c) establish a plan of alimentary safeguard whereby self-sufficiency in food could be achieved;
- (d) consider the creation by ENDA of a central organisation in the Indian Ocean, possibly in Mauritius;
- (e) establish in Mauritius a radio and T.V. "antenna" for the different islands of the Indian Ocean to make people more conscious of the environment;
- (f) create several "ecomusées" in the different islands so as to bring together all the natural, cultural, scientific and social factors that show how close links exist between the different sections of the communities and their environment.

20.8. *The Environment Protection Unit*

20.8.1. In August 1977, the British Council provided the Ministry with the services of Dr. Kenneth Mellanby, Environment Specialist, to look into the environmental problems and advise on the setting up of an environment unit in the Ministry.

The aims and objectives of the unit would be:

- (a) to draw attention of the Government, private bodies and the public to the value of the environment and point out specific threats to it owing to harmful human interference;

- (b) to identify these threats and the damage done to land, sea, countryside, and plant and animal life;
- (c) to prepare legislation for the control of pollution and damage to the environment;
- (d) to advise on the apparatus for enforcement of the legislation by the various ministries etc.;
- (e) to publicise the value of the environment and educate the public to preserve and improve it;
- (f) to conduct research and develop areas whereby the environment can be improved.

20.8.2. Dr. Mellanby evaluated the present situation. In his opinion there were no really serious environmental problems but everything was not perfect: many minor nuisances existed and were causing local damage. He stressed that these should be tackled before the environment is seriously degraded.

20.8.3. He made recommendations concerning the setting up of the Environment Unit, on its staffing, and on how it should work.

20.9. 3. *Complaints*

The Officer in Charge and a Technical Officer (Engineering) investigated complaints and submitted reports and recommendations on a wide variety of cases. Some of the cases dealt with were:—

- (a) Stone crusher at Chemin du Fil, Palma—following complaint from the local inhabitants about dust and noise.
- (b) Fort Victoria Power Station, Port Louis—following parliamentary question alleging pollution.
- (c) Coromandel Industrial Estate—upon the request of the Ministry of Industry and Commerce following complaint that refuse was being dumped outside the Industrial Estate.
- (d) Réunion Sugar Factory (Société REUFAC)—following complaint from public about soot emitted by the factory.
- (e) Trou-aux-cerfs Weather Radar Station—upon the request of the Director of the Meteorological Services to investigate and advise on condensation problems.
- (f) Mauritius Chemical and Fertilizer Industry, Port Louis to investigate pollution hazards caused by smoke emission.

XXI. Agricultural Services, Rodrigues

OFFICER-IN CHARGE : J. F. KWET-ON, ACTING AGRICULTURAL
SUPERINTENDENT

21.1. General

1977 was a dry year, drier than the previous year. Crop yields were in general meagre. Water supply remained one of the main problems of the island.

Rainfall :

			1976	1977	Normal for 10 years
Plaine Corail	...	...	629.5 mm	431.3 mm	—
Pointe Coton	...	...	859.4 mm	683.0 mm	1249 mm
Solitude	...	...	1169.0 mm	1017.1 mm	2009 mm
Lataniers	...	...	950.4 mm	861.1 mm	1492 mm
La Ferme	...	...	1213.4 mm	933.1 mm	1543 mm
Oyster Bay	...	...	789.2 mm	871.0 mm	1396 mm
Riviere Coco	...	...	—	487.6 mm	1284 mm
Port South East	...	...	—	905.3 mm	1071 mm
Marechal	...	...	1168.8 mm	861.7 mm	1326 mm
Anse Ally	...	...	—	393.4 mm	1157 mm

With the general aim to improving the Agricultural Services in the island, the following officers of the Ministry of Agriculture and Natural Resources and the Environment paid visits to Rodrigues during the year. A delegation made up of:

Messrs. B. D. Roy, Chief Agricultural Officer

L. R. Brunet, Principal Agricultural Officer (Livestock)

P. Oogarah, Divisional Scientific Officer (Land Use),

early in the year to examine and establish the programme of work for the current year in relation to past achievements and to social conditions prevailing; Messrs. Jhoree—Veterinary Officer, Pillay—Scientific Officer (Plant Pathologist), J. Govinden—Acting Divisional Scientific Officer (Land Use), at different times during the year to review and advise on problems in their respective fields.

Transport arrangements handicapped the mobility of the technical staff consisting of two Senior Technical Officers and Two Technical Officers.

21.2. Land Development

Land terracing was carried out on the following sites:

Citronelle Section	...	...	Montagne Goyave
St. Gabriel Section	...	...	Citron Donis, Mont Limon
La Ferme Section	...	...	Bay Topaze
Marechal Section	...	...	Deux Montagnes, Grand Var, Montagne Cabri, Baie Malgache
Trefles Section	...	...	Patate Theophile

This project employed a total of 263,328 men-days this year which can be broken down as follows:

Government-paid labour ... 180,713 men-days

W.F.P.-paid labour ... 82,615 men-days

The amount of broken stones used was 34,140 cu. yards.

<i>Type of work</i>			<i>Labour employed</i>	<i>Work accomplished</i>
Bench terraces	...	...	224,455 men-days	1,122,352 feet
Main drains	...	...	4,463 men-days	53,193 feet
Other works (access roads, wind breaks, etc.)	...	...	34,410 men-days	4 miles road

The above works cover an approximate area of 450 arpents.

In 1977, it was decided to promote about 1600 development workers with five years' continuous service in the Agricultural Services to the casual status. With the above promotion, there were left at the end of the year only 635 development workers in the Agricultural Services. These were scattered on different projects. After a reshuffling of the labour force, they were re-grouped on the project of land development in order to make maximum use of W. F. P. assistance which is restricted to development workers working on the Land Development project only. Thus, the W.F.P. assistance which was originally intended for 1200 development workers, is being made use of to the extent of only 50%. This percentage will decrease further next year when other development workers will be promoted casual labourers.

As compared to year 1976 when 292,684 men-days were employed on this project, the labour force employed this year was 263,328 men-days. About 30,000 men-days of labour were transferred to the Forest Division for re-forestation works on a few rare occasions when there were rains.

21.3. *Water Supplies*

The Mt. Cabri reservoir (125,000 gallons), the Bay Topaze well and protection works at Bassin Rodolphin were completed in the first quarter of 1977. The following projects were started and completed:

1. Reconstruction of Corail Reservoir (40,000 gallons)
2. Rivière Banane dam, Creve Coeur Reservoir (60,000 gallons)
3. One small dam at Manique
4. 2 at Rivière Coco and
5. One at English Bay.

Works were in progress on the following sites at the end of the year:

1. Grand Bay Reservoir (30,000 gallons),
2. Solitude Reservoir (10,000 gallons),

3. Rivière Banane Reservoir No. 2 and Pumping Station,
4. Graviers dam and reservoir and
5. Grenade reservoir.

The 4 new "National" pumps received in 1977 helped enormously in providing water to the most distressed localities of the island. A new pumping station is being constructed at Rivière Banane in order to supply water to the Roche Bon Dieu, Grenade, Pte. Coton and Anse Ally areas. A third pump has been installed at Mourouque station which now supplies 75,000 gallons of water daily for distribution. The old "Climax" pump of St. Gabriel has been replaced by one of the new pumps whilst the fourth one will be installed at Bigarade Station in replacement of the old existing "Godwin" pump.

Pipelines

60,670 ft. of pipelines have been laid during the year in the following regions: Mourouque, Canne Paul, Lataniers, Songes, Le Chou, Coromandel, Rivière Banane, Solitude, Grand Bay, Baie du Nord, Bay Malgache, Grand Var and Creve Coeur.

21.4. Pasture Development

Dry conditions still prevailing, pasture development works did not progress along the lines planned. Much more effort had to be devoted to the uprooting of Lantana, planting accacia, and the fencing of plantations by means of stone walls, than to the establishment of grass mixtures and legumes, which was restricted to higher regions like St. Gabriel and Marechal which had more rainfall. At the end of the year, the following had been accomplished:

Two arpents of mixed grasses were planted at Marechal and 15 arpents of grasses/Legumes were planted at St. Gabriel, the species used being kikuyu, siratro, pangola and elephant grass. 95 arpents of vieille fille (Lantana) were removed at Petite Butte and Pointe l'Herbe and the area recovered was planted with accacia.

At the end of 1977, 422 arpents of accacia were planted at the following places: Pte. l'Herbe, Petite Butte, Bay Malgache, Marechal, Grand Var, Rivière Banane, Eau Vannee, Citron Donis and Pompee. To ensure protection against stray animals 9,475 ft. of 5 ft. high stone walls were built.

Weeding was carried out on 113 arpents of established pastures.

21.5. Re-afforestation

The Agricultural Services produced and planted 347,000 tree seedlings of the following species: Tecoma, Eucalyptus, Filao, Bois Noir, Tatamaca, Badamier, Vitex, Pougamme, Vacoas, La Fouche, Lataniers, Bois d'olive, Arjuna terminalia, Jamblon and Mahogany.

The localities planted were:

1. *Trefles section*

Graviers, Grande Montagne, Batatrand, Mt. Bois Noir, Roche Bon Dieu, Patate Theophile, Vainqueur and Rivière Banane	...	100	arpents
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2. *Citronelle section*

Fonds la digue, Mt. Persil, Oyster Bay	...	29	arpents
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3. *Marechal section*

Grand Var, Mangues, Bay Malgache	...	136.7	arpents
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4. *St. Gabriel section*

Citron Donis, Pompee, Eau Vannee, Eau Claire and St. Gabriel	...	80.75	arpents
---	-----	-------	---------

346.75 arpents

Recruiting and maintenance were done on 363 arpents.

Thirty five houses were removed from forest and river reserves and rebuilt on more appropriate sites in this same programme.

Trefles	...	7 houses
St. Gabriel	...	8 houses
Marechal	...	8 houses
Citronelle	...	12 houses
		35 houses

1977

21.6. *Production and Marketing*

The following were exported to Mauritius:

<i>Cattle</i>	<i>Pigs</i>	<i>Sheep</i>	<i>Goats</i>
150 head	1268 head	1934 head	1499 head

<i>Onions</i>	<i>Poultry</i>	<i>Salted fish and dried octopus</i>
17 tons	222 crates of 48 heads	367 bales of 150 lbs

The approximate values of the exports were:

	Rs
150 head of cattle at Rs 2,200/head	... 330,000
1268 head of pig at Rs 375/head	... 475,500
1934 head of sheep at Rs 225/head	... 435,150
1499 head of goat at Rs 225/head	... 337,275
17 tons of onions at Rs 2,600/ton	... 44,200
222 crates of poultry at Rs 750 /crate	... 166,500
367 bales of salted fish/dried octopus at Rs 500 /bale	... 183,500
	1,972,125

Annexed herewith is a table showing the export figures of the usual produce from year 1970 to 1977. The drop in the export of cattle, sheep and goat is the direct influence of the drought which killed about half of the productive herds in the years 1974 and 1975. However, it is interesting to note that these are gradually increasing again.

21.7 *Livestock populations*

	<i>Cattle</i>	<i>Pigs</i>	<i>Goats</i>	<i>Sheep</i>
September 1970	5223	12637	3641	3041
April 1974	5911	8940	4236	4171
January 1975	2422	5911	2873	2822
June 1976	2337	6959	5668	5640
January 1977	3088	7819	5761	8287

In contrast, the productions of pigs, poultry and onions, though may be influenced by the drought are directly dependent on the availability of human labour. To rear pigs and poultry, crops like maize, sweet potato and cassava have to be produced. The main reason for which agricultural productions have shown a marked drop over the past few years is that nowadays most of the potential agricultural labour force has been absorbed in the government service. The primary aim of the W.F.P. Assistance was that the Development workers would become less dependent on relief work with the Land Development Programme. Quite the contrary is happening; the relief workers have become permanent Government employees. The result is that the terraced land leased to them is not being cultivated. It is mostly their women folk who are cultivating lands. Consequently even if the rainfall returns to normal, it is very unlikely that the agricultural production will return to normal.

RODRIGUES EXPORTS TO MAURITIUS

		Cattle Heads.	Pigs: Heads.	Sheep Heads	Goats Heads	Poultry Crates (4 doz.)	Onions Tons	Garlic Tons	Salted fish and dried octopus Bales of 150 lbs
1970	...	...	593	4337	4337 (including Goats)	...	610.2	11.4	4367
1971	...	...	349	2847	3450 (including Goats)	...	721	12.	3745
1972	...	...	713	4141	2536 (including Goats)	...	604	11	3922
1973	...	...	935	3966	3124 (including Goats)	...	632	6	3527
1974	...	...	408	2322	1249	1769	31	—	2491
1975	...	...	804	1485	3305 (including Goats)	...	60	—	1766
1976	...	...	421	1648	1725	1893	126	—	107
1977	...	...	150	1268	1934	1499	17	—	367

*Animal Statistics**Cattle: Balance on the 31.12.77*

Station	Adults		Youngs		Total	
	M	F	M	F		
St. Gabriel	...	2	6	3	10	21
Bay Topaze	...	8	17	8	15	48
Marechal ...	...	2	13	5	12	32
Oyster Bay	...	1	14	8	9	32
						133

There were 94 calvings, producing 63 male and 31 female calves. Three young males and one adult female died. 42 male calves were sold to farmers and 74 old cows were sold to the public by auction.

Pigs: Balance on 31.12.77

<i>Station</i>		<i>Adults</i>		<i>Youngs</i>		<i>Total</i>
		<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	
St. Gabriel	...	4	14	12	27	57
Bay Topaze	...	1	5	6	—	12
Marechal ...	...	2	5	7	2	16
						85

336 piglets were born of which 44 died. 148 were sold to farmers. 4 old boars and 23 unproductive sows were sold by auction.

Goats: Balance on 31.12.77

Station	Adults		Youngs		Total	
	M	F	M	F		
St. Gabriel	...	3	5	7	4	19
Oyster Bay	...	2	—	—	—	2
						21

* Twenty kiddings produced 25 kids. Two old females and 27 young males were sold to farmers. Six youngs and six adults died.

Sheep: Balance on 31.12.77

Station	Adults		Youngs		Total	
	M	F	M	F		
Crab Island	...	4	47	39	48	138

123 lambs were born. 79 rams and 17 ewes were sold to farmers. Four old ewes, one old ram and 24 lambs died.

Rabbit: Balance on 31.12.77

Station	Adults		Youngs		Unsexed	Total
	M	F	M	F		
Marechal	4	14	7	7	15	47

325 kids were born of which 96 died. 147 young males, 107 young females, 2 adult males and 2 adult females were sold to the public.

In general, the condition of livestock of our Livestock Breeding Stations declined due to irregular supply of concentrates from the Richelieu Livestock Feed Factory, where there was shortage of raw materials. Locally available unbalanced feed had to be given to the Livestock.

21.8. *Extension Service*

Livestock

Livestock belonging to private farmers were treated free by the Agricultural Services for the following types of diseases:

1. Difficult calving	...	...	10 cases
2. Eye infections in calves	...	...	118 cases
3. Hind quarter paralysis (pig, sheep, dog)			27 cases
4. Pneumonia in cattle	...	...	2 cases
5. Vitamin deficiency (cattle, pig)		...	145 cases
6. Rickets in calves	...	...	4 cases
7. Worms infestation (sheep, goat, cattle, pig)	...	...	317 cases
8. Adult boar castration	...	...	19 cases
9. Caesarian operation on sows		...	2 cases
10. Eschevia coli in poultry	...	...	1,466 cases
11. Retained placenta in cows	...	...	15 cases
12. Anaemia (all categories livestock)		...	248 cases
13. Mastitis in cows	...	...	2 cases
14. Navel ill in calves	...	...	2 cases
15. Diarrhoea in cattle, sheep, goats		...	103 cases

Crops

The Agricultural Services produced and sold to the public the following planting materials :

Coconut seedlings	...	...	600
Local variety onion seeds	...	...	40 lbs
Red beans	...	...	260 lbs
Pawpaw seedlings	...	...	362
Bread fruit layers	...	...	38
Napoléon Vine cuttings	...	...	283
Ornamentals cuttings	...	...	67
Lime seedlings	...	...	1,949

Sooty mould was treated on 38 orange trees, 686 lime trees and 80 lemon trees belonging to farmers with FOLIMAT and CUPRAVIT.

Our demonstrations Plot produced 6,915 pounds of assorted vegetables, of which 5,086 pounds were issued free to hospitals and Primary School Camps and 1,829 pounds sold to staff members of the plot.

3½ arpents of mulberry cuttings were planted at St. Gabriel and Marechal.

Spraying of pesticides was carried out free on farmers' crops.

21.9. Agricultural Roads

Considerable efforts were made during 1977 to maintain agricultural roads in reasonable conditions, whilst road construction was undertaken to have access to new sites of work. 60.25 miles of existing roads were thus repaired and 5.3 miles of access roads were opened by Agricultural Services.

APPENDIX I

Staff (as at 31st December, 1977)

<i>Appointment</i>	<i>Name</i>	<i>Remarks</i>
Permanent Secretary ...	L. Purmessur, B.Sc. Econ. (London)	
Principal Assistant Secretary	R. M. Hurdowar, B.A. (Hons) (East Africa), D.P.A.M. (Maur.)	
Chief Agricultural Officer ...	D.B.N. Roy, B.Sc. (Wales), Dip Agri. (Maur.)	
Veterinary Adviser ...	—	Vacant
Principal Agricultural Officer (3)	K. Lutchmeenaraidoo, B.Sc. Agri (Reading), Dip. Agri (Maur.)	
	R. J. S. Moutia, D. Phil. (Gauhati), B.Sc. Hort. (London), Dip. Agri Econ. (Oxford), City & Guilds (Sugar Manufacture) 1st Class Cert. (London), Dip. Agric. (Maur.)	On leave
	T.M. Narain, B.Sc. Agri., M.Sc. Agri Ext. (Reading), Dip. Agric. (Maur.)	
Temporary Principal Agricultural Officer	L. R. Brunet, B.Sc. Agri. (Reading), Dip. Agr. Ext. (Queensland), Dip. Agric. (Maur.)	
ADMINISTRATIVE AND FINANCE DIVISIONS		
Administrative Officer (3) ...	A. I. Oozeerally, D.P.A.M. (Maur.)	
	J. C. Rivet, D.P.A.M. (Maur.)	
	S. Vithilingum, B.A. (General) London Div. III	
Principal Establishment Officer	B.P. Sawmy	
Principal Finance Officer ...	D. Ramyeard	
Senior Establishment Officer	L. Gopaul	
Senior Establishment Officer	M. Kadel	
Establishment Officer ...	Mrs. D. Mardamootoo	
Senior Executive Officer ...	—	... Vacant

APPENDIX I—*continued*

<i>Appointment</i>	<i>Name</i>	<i>Remarks</i>
In addition there were	3 Higher Executive Officers	
	15 Executive Officers	
	26 Clerical Officers (11 giving assistance at C.O. level)	
	48 Clerical Assistants (5 giving assistance at C.A. level)	
	1 Principal Stores Officer	Paid from the
	1 Higher Stores Officer	vote of the
	2 Stores Officers	Ministry of Finance
	3 Senior Confidential Assistants	
	2 Confidential Assistants	
	12 Typists (2 giving typing assistance)	
	2 Head Office Attendants	
	19 Office Attendants	

AGRICULTURAL DIVISION

Divisional Scientific Officer (Agronomy)	A. L. Owadally, Ph.D. Agric. (Nottingham), B.Sc. (Hons.) Agric. Bot. (Wales), Dip. Agric. (Maur.)	
Scientific Officer (Agronomy)	J.R.N. Govinden, B.Sc. (Hons.) Agric. (Ibadan), M.Sc. Crop Science (Saskatchewan)	Officer in charge Land Use Division
	S. N. Naidu, B.Sc. (Hons.) Agri. (Maur.), M.Sc. (Biometry) (Reading), Dip. Agric. (Maur.)	
	P. P. Vyapoory, B.Sc. (Hons) Agric., Dip. Agric. (Maur.)	On leave
	H. Rojoa, B.Sc. (Hons.) Agric. (Punjab)	On leave
	C. G. Pallany, B.Sc. (Hons.) Agric. (Maur.)	
	L. C. K. Li Kwan Pun, B.Sc. (Hons.) Agric. (Maur.), Dip. Agric. (Maur.)	
	K. Ramdoyal, Dip. Agric. and Sugar Tech. & BSc. (Hons.) Agric.	On leave
	M.V.D. Domun, B.Sc. (Hons.)) Agric. Class II (Maur.)	
	J. M. Heerasing B.Sc. (Hons.) Agric. (Maur.)	
	M. Y. Boodoo, B.Sc. (Hons.) Agric. (Maur.)	(Temp.)

APPENDIX I—*continued*

<i>Appointment</i>	<i>Name</i>	<i>Remarks</i>
Scientific Officer (Horticulture)	I. Rajkomar, B.Sc. (Hons.) Agric. (Udaipur)	On leave
	M. Ramtohul, B.Sc. (Hons.) Agric. & A.H. (Uttar Pradesh)	On leave
	K. F. Lan Chow Wing, B.Sc. (Hons.) Agric. (Maur.) Dip Agric. (Maur.)	
	S. Seeruttun, B.Sc. (Hons.) Agric. (Maur.) Dip. Agric. (Maur.)	Temporary
	V. Veerappa, B.Sc. (Hons.) Agric. (Maur.), Dip. Agric. (Maur.)	Temporary
In addition there were	: 6 Technical Officers (Agric.) 1 Clerical Officer 1 Office Attendant	

CANE PLANTERS' & MILLERS' ARBITRATION & CONTROL BOARD

General Manager	... A. A. Aumeerally, C. G. L. I. (Sugar Manufacture), B.Sc. Sugar Eng., B.Sc. Chem. Eng. (L.S.U.), Dip. Agric. (Maur.)	
Sugar Technologist	... I. D. Nawoor, B.Sc. General B.Sc. (Hons.) Chem. (Wales)	
Accountant	... —	... Vacant
Senior Area Superintendent	—	... Vacant
Assistant Sugar Technologist	A. A. Tin Loi, B.Sc. (Hons.) Sugar Tech. (Maur.), Dip. (Hons.) Agric. (Maur.) K. Deepchand, B.Sc. (Hons.) Sugar Tech. (Maur.)	
Temporary Assistant Sugar Technologist	D. Valaydon, B.Sc. Sugar Tech. & Diploma in Agric. and Sugar Tech. (Maur.)	
Area Superintendent	... I. Aumeerally, Dip. Agric. (Maur.) C.G.L.I. (Sugar Manufacture)	2 vacancies
Finance Officer	... S. Jogee	

APPENDIX I—*continued*

<i>Appointment</i>	<i>Name</i>	<i>Remarks</i>
In addition there were	7 Senior Technical Officers (Sugar)	5 vacancies
	14 Technical Officers (Sugar) ...	5 vacancies
	27 Senior Technical Assistants	
	42 Technical Assistants ...	6 vacancies
	2 Laboratory Attendants	
	Punch Room Supervisor ...	vacant
	Punch Verifier Operator ...	vacant
	1 Telephone Attendant	
	2 Executive Officers ...	1 vacant
	Confidential Assistant ...	Vacant
	8 Clerical Officers (1 is giving assistance at Clerical Officer level)	5 vacancies
	1 Shorthand Writer-Senior Confidential Assistant	
	8 Clerical Assistants	
	2 Office Attendants	

PLANT PATHOLOGY DIVISION

Divisional Scientific Officer (Plant Pathology)	G. M. Lallmahomed, Post Grad. Cert. Nematology (Wageningen), B.Sc. (Hons.) Agr. Biol. (Ibadan), Dip. Agric. (Maur.)
Scientific Officer (Plant Pathology)	J. Bucha, M.Sc. (Auckland), B. Sc. (Auckland)
	M. Pillay, B. Sc. (Hons.) Bot. (Delhi), Post Grad. Cert. Plant Protection (Wageningen)
	M.I. Dossa, B. Sc. (Hons.) Microbiol. M. Sc. Agric. Microbiol. (Karachi)
Senior Technical Officer	S. Fakim, Dip. Agric. (Maur.), G.C.L.I. (Sugar Manufacture)
	F.B.Y. Gerval, Dip. Agric. (Maur.)
	M.A. Peeroo, Dip. Agric. (Maur.)
	S.S. Wong Ng, Dip. Agric. (Maur.)
	K. Li Yuen Fong, Dip. Agric. (Maur.)
	D. Tourabally, Dip. Agric. (Maur.)
	M. Chinappen, B. Sc. Bot. (Madras)
	N.B.Y. Yerrigadoo, B. Sc. (Osmania)

APPENDIX I—continued

<i>Appointment</i>	<i>Name</i>	<i>Remarks</i>
In addition there were	: 3 Technical Officers (Scientific) 1 Extra Technical Officer 8 Laboratory Attendants 1 Clerical Officer 1 Clerical Assistant	

ENTOMOLOGY DIVISION

Divisional Scientific Officer	M.J.L. Monty, B.Sc. (Hons.) Entomol. (Queensland), Dip. Agric. (Maur.) A. Joomaye, B. Sc. (Hons.) Zool. & Bot. (East Africa) M. Sc. (I.A.R.I.) M. Ramsamy, B. Sc. (London), M. Phil. Zool. (London) Miss S. I. Balluck, B.Sc. Zool. M.Sc. Zool. (Delhi)	
Senior Technical Officer (Agriculture)	Mrs M. Li Ting Wai, Dip. Agric. (Maur.)	

In addition there were:—

- 3 Technical Officers (Scientific)
- 2 Extra Technical Officers
- 1 Senior Field Assistant
- 1 Field Assistant
- 2 Agricultural Trainees
- 3 Agricultural Assistants
- 6 Laboratory Attendants
- 1 Clerical Officer
- 1 Office Attendant

AGRICULTURAL CHEMISTRY DIVISION

Divisional Scientific Officer (Agricultural Chemistry)	L. C. Lam Thuon Mine, B.Sc. Chem. (London)	
Scientific Officer (Agricultural Chemistry)	N. N. Ramanjooloo, B.Sc. (Hon.) Chem. (Delhi) A. H. Mohungoo, B.Sc. (Hons.) Chem. (Aligarh)	
Temporary Scientific Officer (Agricultural Chemistry)	N. Coonjan. B.Sc. (Hons.) Bombay	

In addition there were:—

- 3 Technical Officers (Scientific)
- 1 Extra Technical Officer
- 5 Laboratory Attendants
- 1 Clerical Assistant

APPENDIX I—continued

ANIMAL PRODUCTION DIVISION

<i>Appointment</i>	<i>Name</i>	<i>Remarks</i>
Divisional Scientific Officer (Animal Husbandry)	J. A. C. Delaitre, B.Sc. Agric. (New Zealand)	Retired in Nov. 1977
Scientific Officer (Animal Husbandry)	B. Hulman, B.Sc. Agric. (Allahabad)	On leave
	L. K. Ma Poon, B.Sc. (Hons.) Agric. (Ife), Dip. Agric. (Mauritius)	Acting Divisional Scientific Officer (Animal Husbandry)
	A. A. Boodoo, B.Sc. Agric. (Addis Ababa)	
	H. Gaya, B.Sc. Agric. (Allahabad)	

In addition there were:—

- 1 Technical Officer (Agriculture)
- 1 Technical Officer (Livestock)
- 1 Agricultural Assistant
- 1 Higher Clerical Officer
- 1 Typist/Stenographer
- 1 Office Attendant

ANIMAL HEALTH DIVISION

Principal Veterinary Officer	M. F. Mosaheb, B.V.Sc., B.Sc. and A.H. (Punjab), M.Sc. Tropical Veterinary Science (N. Queensland)	
Veterinary Officer	... R. C. S. Fokeer, B.V.Sc., & A.H. (Bombay)	} on leave
	L. L. Beeharry, B.V.S and A.H. (Uttar Pradesh)	
	D. Sibartie, B.V.M. (Nairobi)	
	J. Maudarbaccus, B.V.Sc & A.H. (Bombay)	
	R. Deenoo, B. V. Sc. & A.H. (Bombay)	
	H. Jhoree, M. Sc. (Kiev)	
	I. L. Prayag (Temp.) B.V.M. (Kampala)	
	V. S. Jugessur (Temp.) B.V. Sc. & A.H. (Haryana)	

APPENDIX I—continued

<i>Appointment</i>	<i>Name</i>	<i>Remarks</i>
Laboratory Technologist ...	L.H.R. Maurice, Dip. Agric. (Maur.) A.K. Matabadul, B. Sc. (Hons.) (Microbiology Bombay)	
Senior Technical Officer (Livestock)	C.A. Adelson M. Bhunnoo, Dip. Agric. (Maur.)	
Senior Technical Officer ... (Agriculture)	M. Govendasamy, Dip. Agric. (Maur.) D. Ramessur, Dip. Agric. (Maur.)	On leave
In addition there were :	10 Technical Officers (Livestock) 3 Technical Officers (Scientific) 12 Senior Technical Assistants (Livestock) 16 Technical Assistants (Livestock) 3 Agricultural Assistants 5 Laboratory Attendants 1 Executive Officer 2 Clerical Officers 6 Clerical Assistants 2 Typist/Stenographers 4 Office Attendants	

DAIRY CHEMISTRY DIVISION

Divisional Scientific Officer (Dairy)		Vacant
Scientific Officer (Dairy)	P. Mardamootoo, B. Sc. (Hons.) Chem. (Delhi), M.Sc. Chem. (Delhi) J.F.S. Ng Man Sun, B. Sc. ... (Hons.) Chem. (Manchester)	On leave Officer in Charge Dairy
In Addition there were :	4 Technical Officers (Scientific) 2 Agricultural Assistants 4 Laboratory Attendants 1 Clerical Assistant 1 Typist/Stenographer	

APPENDIX I—*continued*

EXPERIMENTAL STATIONS

<i>Appointment</i>	<i>Name</i>	<i>Remarks</i>
Agricultural Superintendent	S.Y.E. Doomun	
Senior Technical Officer (Agriculture)	A. A. M. Osman, Dip. Agric. (Maur.) A. C. Chan Hing Chong, Dip. Agric. (Maur.) A. C. Gouges, Dip. Agric. (Maur.) Y. L. Kong Ting Lun, Dip. Agric. (Maur.) L. C. M. Li Ting Wai, Dip. Agric. (Maur.) F. S. Lam Kee, Dip. Agric. (Maur.) J. Dindoyal, B.Sc. Agric. (Poona) D. Gya, B.Sc. (Hons.) Agric. (Poona)	
In addition there were	: 11 Technical Officers (Agriculture) 7 Senior Technical Assistants (Agric.) 3 Senior Field Assistants 2 Field Assistants 19 Technical Assistants (Agriculture) 9 Agricultural Assistants 1 Technical Assistant (Livestock) 2 Agricultural Trainees 3 Clerical Officers (1 giving assistance at C.O. level) 31 Clerical Assistants 1 Typist/Stenographer 10 Office Attendants	

LIVESTOCK BREEDING STATION

Agricultural Superintendent	Y. Aumjaud, Dip. Agric. (Maur.)
Senior Technical Officer (Agriculture)	A. Pooloo, Dip. Agric. (Maur.) S. M. Sheik Hossen, M.Sc. Agric. (Kiev.) B. A. C. D. Gumani, B.Sc. Agric. (India) T. K. Ah-Keng, Dip. Agric. (Maur.)

APPENDIX I—*continued*

<i>Appointment</i>	<i>Name</i>	<i>Remarks</i>
In addition there were	: 1 Technical Officer (Agriculture)	
	1 Technical Officer (Livestock)	
	1 Senior Field Assistant	
	1 Field Assistant	
	3 Senior Technical Assistants (Agric.)	
	1 Senior Technical Assistant (Livestock)	
	1 Technical Assistant (Agric.)	
	10 Technical Assistants (Livestock)	
	9 Agricultural Assistants	
	1 Executive Officer	
	1 Clerical Officer	
	6 Clerical Assistants	
	1 Typist/Stenographer	
	6 office Attendants	

ENGINEERING DIVISION

Principal Agricultural Engineer	A. R. Satar, B.Sc. Agric. Eng. (Israel), M. I. Agric. E., Dip. Agric. (Maur.)
Agricultural Engineer (2) ...	N. Toolsee, B.Sc. (Agric. Eng.) Udaipur
	S. Purmanand, B.Sc. (Agric. Eng.) Udaipur
Assistant Agricultural Engineer	M. Morad, Dip. Agric. (Maur.)
In addition there were	: 1 Executive Officer
	1 Clerical Officer
	2 Clerical Assistants
	1 Office Attendant

FIELD SERVICES DIVISION

Senior Agricultural Superintendent	M.I. Fakim, Dip. Agric (Maur.)
Agricultural Superintendent	M. Sooltangos, Dip. Agric. (Maur.)
Senior Technical Officer (Agric.)	S. Panyandee, M.Sc. Agric. (Bucarest)
	Mrs. F. Lallmahomed-Ciechanowski, MSc. in Agric. (Engineering) (Poland)

APPENDIX I—*continued*

<i>Appointment</i>	<i>Name</i>	<i>Remarks</i>
In addition there were	: 3 Technical Assistants (Agric.) 1 Technical Assistant (Livestock) 4 Agricultural Assistants 2 Clerical Officers 6 Clerical Assistants 1 Office Attendant	
EXTENSION SERVICES DIVISION		
Temp. Divisional Scientific Officer	S. P. Mauree, B.Sc. Agric. Madras	On leave
Acting Divisional Scientific Officer	G. Naidoo, B.V.Sc. & A.H. (India)	
Scientific Officer (Agronomy)	K. Ramdoyal, B.Sc. (Hons.) Agric. (Maur.) Dip. Agric. (Maur.) O. Bissonauth, B.Sc. (Hons.) Agric. (Maur.)	On leave
Agricultural Superintendent	S. P. Vythilingum, Dip. Agric. (Maur.) J. J. A. Ferrière	On leave
Senior Technical Officer (Agriculture)	I. Sassa, Dip. Agric. (Maur.) M. F. Jeerooburkhan, Dip. Agric. (Maur.) M. John Chuan, Dip. Agric. (Maur.) M. Goolamhossen, Dip. Agric. (Maur.) J. C. Appapoulay, Dip. Agric. (Maur.) N. Teeluck, Dip. Agric. (Maur.) R. Gohabar , B.Sc. Agric. (Sind.) Lee Kien Vong, Dip. Agric. (Maur.) D. Dummur, Dip. Agric. (Maur.) B. A. D. Gumani, B.Sc. Agric. (India)	On leave On leave On leave On leave On leave without pay On leave

APPENDIX I—*continued*

<i>Appointment</i>	<i>Name</i>	<i>Remarks</i>
In addition there were	: 20 Technical Officers (Agric.)	1 is on leave
	4 Technical Officers (Livestock)	
	1 Senior Field Assistant	
	6 Field Assistants	
	4 Technical Assistants (Agric.)	
	34 Agricultural Trainees	
	1 Agricultural Assistant	
	1 Publicity Assistant	
	1 Clerical Officer	
	5 Clerical Assistants	
	3 Office Attendants	
	1 Typist/Stenographer	

PROJECTS IMPLEMENTATION DIVISION

Divisional Scientific Officer (Agriculture)	K. Ramdaursingh, B.Sc. (Hons.) Agr. & A.H. (U.P. Ag.) Dip. Agric. (Maur.)	
Scientific Officer (Agronomy)	M. V. D. Domun, B.Sc. (Hons.) Agric. (Maur.)	
Agricultural Superintendent	B. Nundloll	

In addition there were	: 1 Technical Officer (Agriculture)	
	1 Senior Surveyor	
	1 Surveyor	On leave
	1 Surveyor Assistant	
	2 Junior Draughtsman	
	1 Printing Machine Operator	
	1 Field Assistant	
	2 Clerical Assistants	
	1 Office Attendant	
	1 Typist/Stenographer	

LAND USE DIVISION

Divisional Scientific Officer (Agriculture)	P. Oogarah, B.Sc. Agric. (Massey, New Zealand), Postgrad. Dip. Agric. Eng. (U.K.) M.I. Agric. E., Post- grad. Cert. Course in Land Resources Planning (U.K.) Dip. Agric. (Hons.) (Maur.)	On leave
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APPENDIX I—*continued*

<i>Appointment</i>	<i>Name</i>	<i>Remarks</i>
Scientific Officer (Agronomy)	J. R. N. Govinden, B.Sc. (Hons.) Agric. (Ibadan), M.Sc. Crop Science (Saskatchewan)	Officer in charge
Agricultural Superintendent	C. S. Amide, Dip. Agric. (Maur.)	
In addition there were	: 1 Technical Officer (Agriculture) 1 Technical Officer (Engineering) 1 Clerical Officer 1 Clerical Assistant 1 Office Attendant	Temporary

AGRICULTURAL SERVICES — RODRIGUES

Acting Agricultural Superin- tendent	John Franklin Kwet-On, Dip. Agric. (Maur.)	
Scientific Officer (Soil Conservation)	—	Vacant
Scientific Officer (Animal Husbandry)	—	Vacant
Scientific Officer (Agronomy)	—	Vacant
Senior Technical Officer	Joseph Wilson Tolbize, Dip. Maur.)	
In addition there were	: 2 Technical Officers (on tour service)	

APPENDIX II

Composition of Principal Boards and Committees**(i) BOARD OF AGRICULTURE, NATURAL RESOURCES AND THE ENVIRONMENT**

The Permanent Secretary, Ministry of Agriculture and Natural Resources and The Environment—*Chairman*

The Chief Agricultural Officer

The Conservator of Forests

Mr. R. Yat Sin, representative of the Minister of Finance

Mr. G. Danjoux, representative of the Minister of Housing, Lands and Town and Country Planning

Mr. C. Moti, representative of the Minister of Cooperatives and Cooperative Development

Mr. S. Hossenbux, representative of the Minister of Labour and Industrial Relations

Members of the Legislative Assembly

The Honourable L. C. N. Guimbeau, M.L.A.

The Honourable A. R. N. A. Peeroo, M.L.A.

The Honourable Mrs. Ghislaine Henry, M.L.A.

Dr. the Honourable A. S. Kasenally, M.L.A.

Representatives of Planters

Mr. I. Bundhoo

Mr. H. Jhummun

Mr. Allan Cambier

Mr. Robert Antoine, C.B.E., representative of the Mauritius Sugar Industry Research Institute

Mr. J. Manrakhan, representative of the University of Mauritius

Mr. Adolphe Vallet, representative of the Chamber of Agriculture

Mr. Jiahman Bhurtun, representative of the Mauritius Cooperative Agricultural Federation Ltd.

(ii) CANE PLANTERS AND MILLERS ARBITRATION AND CONTROL BOARD

Mr. L. E. Venchard, Q.C. —*Chairman*

Mr. A. I. Oozeerally, (Administrative Officer, Ministry of Agriculture and Natural Resources and The Environment) — Representative of the Minister of Agriculture and Natural Resources and The Environment

Mr. Currim Currimjee — Independent Member

Mr. Serge Staub

Mr. Theo Maigrot

} representatives of millers

Mr. Balkrishna Ramphul, Representative of planters cultivating cane on 30 or more arpents of land

Mr. L. M. Mungur, Representative of planters cultivating on less than 30 arpents of land

Mr. Gobhurdhun Ramnarain, Representative of planters who are members of credit cooperative societies

APPENDIX II—*continued*

TOBACCO BOARD

A Principal Agricultural Officer — *Chairman*

The Commissioner of Excise — *Vice-Chairman*

The General Manager of the Board

The General Manager, British-American Tobacco Co. (Mauritius) Ltd., or his representative

The Managing Director, Amalgamated Tobacco Corporation (Mauritius) Ltd., or his representative

Mr. Omar Maudarbaccus

Mr. A. Georges Rey

Mr. P. Shibchurn

Mr. Paramhans Sooknah

Mr. Aneerood Purgas

Mr. D. Gungadeen

Mr. I. N. Roy

Mr. Beewa Mahadoo

(iv) THE LAND SETTLEMENT COMMITTEE

The Divisional Scientific Officer (Land Use) — *Chairman*

Honourable L. C. N. Guimbeau, M.L.A.

Honourable A. R. A. Peeroo, M.L.A.

Mr. G. Naidoo, Acting Divisional Scientific Officer (Extension)

A representative of the Ministry of Housing, Lands and Town and Country Planning

A representative of the Ministry of Cooperatives and Cooperative Development

Mr. Allan Gambier

Mr. C. S. Amide, Agricultural Superintendent (Land Use)

(v) TEA BOARD

The Permanent Secretary, Ministry of Agriculture and Natural Resources and The Environment, or his representative — *Chairman*

Mr. R. Ramyeed, Principal Finance Officer, representative of the Ministry of Finance

The Registrar of Cooperative Societies or his representative

The General Manager of the Tea Development Authority

Mr. Jacques Bourelly, representative of the Chamber of Agriculture

Mr. J. Ramdin

Mr. L. P. de Maroussem

Mr. Seewoonundun Chatoory, representative of planters

Mr. Indurdeosing Jaypalsing, representative of metayers

Mr. H. R. K. Aubdool

Mr. D. Gungadeen

representatives of manufacturers

Two other persons

APPENDIX II—*continued*

(iv) SUGAR MILLERS DEVELOPMENT FUND COMMITTEE

- | | |
|---|------------------------------|
| Mr. Lutchun Purmessur, Permanent Secretary, representative of Minister of Agriculture and Natural Resources and The Environment — <i>Chairman</i> | |
| Mr. Dipnarain Manna, Administrative Officer, representative of the Minister of Finance | |
| Mr. A. Pierre Dalais | } representatives of Millers |
| Mr. Pierre Dinan | |
| Mr. Cyril Lagesse | |
| Mr. J. L. Edouard Rouillard | |
| Mr. E. P. G. White | |

(vii) SUGAR PLANTERS DEVELOPMENT FUND COMMITTEE

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|---|-------------------------------|
| Mr. Lutchun Parmessur, Permanent Secretary, representative of the Minister of Agriculture and Natural Resources and The Environment — <i>Chairman</i> | |
| Mr. Dipnarain Manna, Administrative Officer, representative of the Minister of Finance | |
| Mr. Chiranjive Moti, Registrar of Cooperative Societies, representative of the Minister of Cooperatives and Cooperative Development | |
| Mrs. E. Hanoomanjee, Economist, representative of the Ministry of Economic Planning and Development | |
| Mr. J. Gopee | } representatives of planters |
| Mr. B. Boolakee | |
| Mr. I. N. Roy | |
| Mr. H. Ruhee | |
| Mr. M. P. Kisnah | |

(viii) SUGAR INDUSTRY DEVELOPMENT FUND COMMITTEE

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|---|
| Mr. Lutchun Purmessur, Permanent Secretary, representative of the Minister of Agriculture and Natural Resources and The Environment — <i>Chairman</i> |
| Mr. Dipnarain Manna, Administrative Officer, representative of the Minister of Finance |
| Mr. E. P. G. White |
| Mr. Cyril Lagesse |
| Mr. Rafick Osman |
| Mr. Hansraj Ruhee |
| Mr. Ramtohul Aukel |

APPENDIX II—*continued*

(ix) SUGAR PLANTERS MECHANICAL POOL CORPORATION BOARD

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|---|--|
| Mr. T. M. Narain, Principal Agricultural Officer,
representative of the Ministry of Agriculture and
Natural Resources and The Environment | } Representatives of
the Government |
| Mr. D. Manna, Administrative Officer, representative
of the Ministry of Finance | |

A representative of the Sugar Planters Development Fund

- Mr. R. Balgobin
Mr. T. Ramphul
Mr. C. Dwarkasingh
Mr. R. Osman

(x) TEA DEVELOPMENT AUTHORITY

- Mr. S. Nagamootoo — *Chairman*
The Permanent Secretary, Ministry of Agriculture and Natural Resources
and and The Environment — *Vice-Chairman*
A Principal Agricultural Officer (representing the Ministry of Agriculture and
Natural Resources and The Environment)
The Registrar of Cooperative Societies
The Chairman of the Tea Board
Mr. S. Palayathan, Administrative Officer (representing the Ministry of
Finance)
Mr. L. Philippe de Maroussem (representing the Chamber of Agriculture)
Mr. Heerall Bissessur (representing the Federation of Credit and Tea Market-
ing Cooperative Societies)
Mr. Peter White

(xi) AGRICULTURAL MARKETING BOARD

- Mr. T. Callychurn — *Chairman*
Mr. G. Kooraram — *Vice-Chairman*

Official Members

- The Chief Agricultural Officer (representing the Ministry of Agriculture and
Natural Resources and The Environment)
A Principal Finance Officer (representing the Ministry of Finance)
Mr. J. Ramjada, Administrative Officer (representing the Ministry of Com-
merce and Industry)
The Registrar Cooperative of Cooperative Societies or his representative

Unofficial Members

- Mr. Mahmood Edah Tally
Mr. P. Maureemootoo
Mr. M. K. Ng Wong Hing
Mr. L. Ramdin, M.B.E.
Mr. Jaynarain Dhowtall
Mr. Olaganaden Vassoo Vythilingum

APPENDIX III

Legislation

Proclamations

No. 3 of 1977 — To provide for the protection of wild birds

No. 4 of 1977 — To fix the date for the coming into operation of the Board of Agriculture and Natural Resources and Environment Act 1977

No. 8 of 1977 — To extend the deer shooting season

Acts

No. 2 of 1977 — The Board of Agriculture, Natural Resources and the Environment Act 1977

No. 5 of 1977 — The National Federation of Young Farmers' Clubs Incorporation (Amendment) Act 1977

No. 32 of 1977 — The Animal Feed Control Act 1977

Government Notice

No. 65 of 1977 — The M.S.I.R.I. (Rates of Cess) (Amendment) Order 1977.

APPENDIX IV

**List of Publications and Contributions to Literature by Officers of the
Agricultural Services during 1977**

<i>Name of Author</i>	<i>Title of Paper</i>	<i>Name Vol. No. Page Nos. of Periodical in which published</i>
H. Gaya, J. C. Delaitre and T. R. Preston	Effect of restricted suckling and bucket feeding on the growth rate of calves and on milk yield	Tropical Animal Production, Vol. 2, pp. 284 — 287
L. K. Ma Poon, C. Delaitre and T. R. Preston	The value for milk production of supplements of mixtures of final molasses, bagasse pith and urea, with and without combinations of maize and groundnut cake	Tropical Animal Production, Vol. 2, pp. 148 — 150
M. Ramsamy ...	... Effects of gamma radiation on the stable fly, <i>Stomoxys</i> <i>nigra</i> Macquart (Diptera Muscidae)	Bulletin of Entomological Re- search, No. 67 (1): 49 — 56
J. Monty ...	... Entomological News	... Revue Agricole et Sucrière de l'île Maurice, Vol. 56: pp. 107 — 109

APPENDIX V

Conversion Table

1 Arpent ...	...	...	1.043 acres
1 Gaulette ...	...	...	10.61 feet
1 Metric Ton ...	...	...	1,000 kilos
1 Long Ton ...	...	...	1,016 kilos
1 Pound Avoirdupois ...	...	...	454 grams
1 Kilo ...	...	...	1,000 grams
1 Hundredweight ...	...	...	50.803 kilos
1 Cord ...	...	...	92.82 cubic feet
1 Imperial Gallon ...	...	...	4.45 litres
1 Rupee ...	...	...	8.20 pence

